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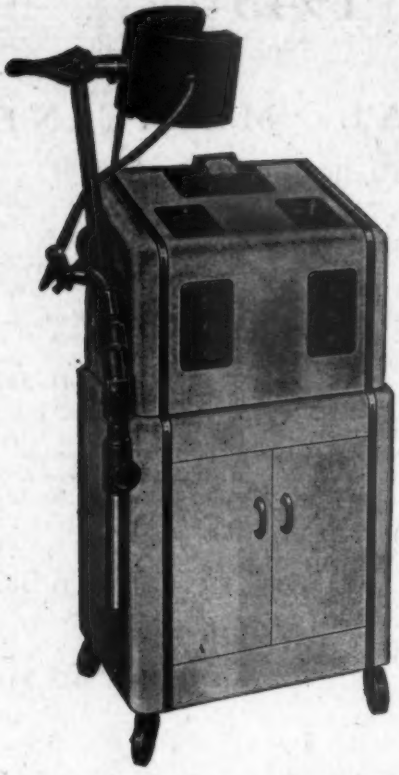
Boston, Massachusetts

Printed in U. S. A.



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COMBINED TREATMENT OF RHIZOMELIC SPONDYLOSIS

(Marie-Strümpell Arthritis) *

Orthopedic, Roentgen Ray and Physical Therapy

LENOX D. BAKER, M.D.

DURHAM, N. C.

Rhizomelic spondylosis, as the name implies, is a disease of the spine and root joints. It is sometimes called Von Bechterew's or Marie-Strümpell arthritis and is usually classified as a form of atrophic arthritis. Such a classification may be in error. Experience has shown that atrophic arthritis does not respond to roentgen therapy. The fact that rhizomelic spondylosis does respond to small doses of ray therapy is at least indicative that the cellular changes in this disease are of different nature from those in atrophic arthritis.

In two previous publications from Duke hospital apparatus has been described and preliminary reports have been made on the treatment of rhizomelic spondylosis by roentgen ray combined with physical therapy and orthopaedic measures.[1] Hemphill and Reeves[2] have presented a statistical report of the results obtained in 172 cases of Marie-Strümpell arthritis treated at Duke Hospital by roentgen ray therapy. The purposes of this, our fourth review of the subject, are (1) to point out the pathognomonic symptoms of the disease, (2) to outline important details of examination and treatment, (3) to discuss the results seen thus far from the combined therapy and (4) to emphasize the necessity of complete treatment directed at relief of pain, correction of deformities and rehabilitation of the patient.

The major portion of this report is to be devoted to the physical therapy aspects of the disease. Those interested in general discussions of the subject are referred to Herrick and Tyson[3] for a presentation of the medical aspect of the disease; to Forestier[4] for an excellent description of the roentgenologic changes; to Swaim[5] for the orthopaedic treatment; to Smyth, Freyberg and Lampe[6] for the roentgen therapy, and to our previous publications for a general discussion of the combined treatment.[1]

In order to standardize the study and treatment of patients with Marie-Strümpell arthritis, charts have been prepared for use in the various stations about the hospital where these patients are cared for. The charts show in outline form the symptoms and differential diagnosis, the physical signs and the roentgenologic changes, and they give directions for examination of the patient, ward care, roentgen ray therapy, physical therapy and home treatment. Specimen charts are presented in the appendix to this paper, as it is

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* Read at the Twenty-Third Annual Session of the American Congress of Physical Medicine, Cleveland, Sept. 8, 1944.

From the Orthopedic and Physical Therapy Divisions, Department of Surgery, Duke University School of Medicine, Durham, N. C.

Roentgen therapy was given under the supervision of Dr. Robert J. Reeves and associates.

Physical therapy was given under the direction of Miss Helen Kaiser.

1. Baker, L. D.: (*a*) Rhizomelic Spondylosis, Orthopædic and Roentgen Therapy, J. Bone & Joint Surg. 24:827 (Oct.) 1942; (*b*) Ankylosing Spondylarthritis, Marie-Strümpell Arthritis, Roentgen and Orthopedic Therapy, South. M. J. 36:180 (March) 1943.
2. Hemphill, J. E., and Reeves, R. J.: Paper read before the American Roentgen Ray Society, Chicago, Sept. 24-29, 1944.
3. Herrick, W. W., and Tyson, T. Lloyd: The Medical Aspect of Ankylosing Spondylitis (Marie-Strümpell), Ann. Int. Med. 15:994, (July-Dec.) 1941.
4. Forestier, Jacques: The Importance of Sacro-Iliac Changes in Early Diagnosis of Ankylosing Spondylarthritis, Radiology, 33:389 (July-Dec.) 1939.
5. Swaim, Loring T.: The Orthopædic Treatment of Marie-Strümpell Arthritis, J. Bone & Joint Surg. 21:983 (Oct.) 1939.
6. Smyth, C. J.; Freyberg, R. H., and Lamps, Isadore: Roentgen Therapy for Rheumatoid Arthritis of the Spine, J. A. M. A. 117:826 (Sept. 6) 1941.

felt that they will be of more aid than a narrative report to those who make similar studies.

On the patient's admission to the hospital the studies outlined in chart 1 are instituted. In the history taking, inquiry is made as to the symptoms listed in chart 2. During the physical examination, special search is made for the signs listed in chart 3. As a rule no corrective measures are at-

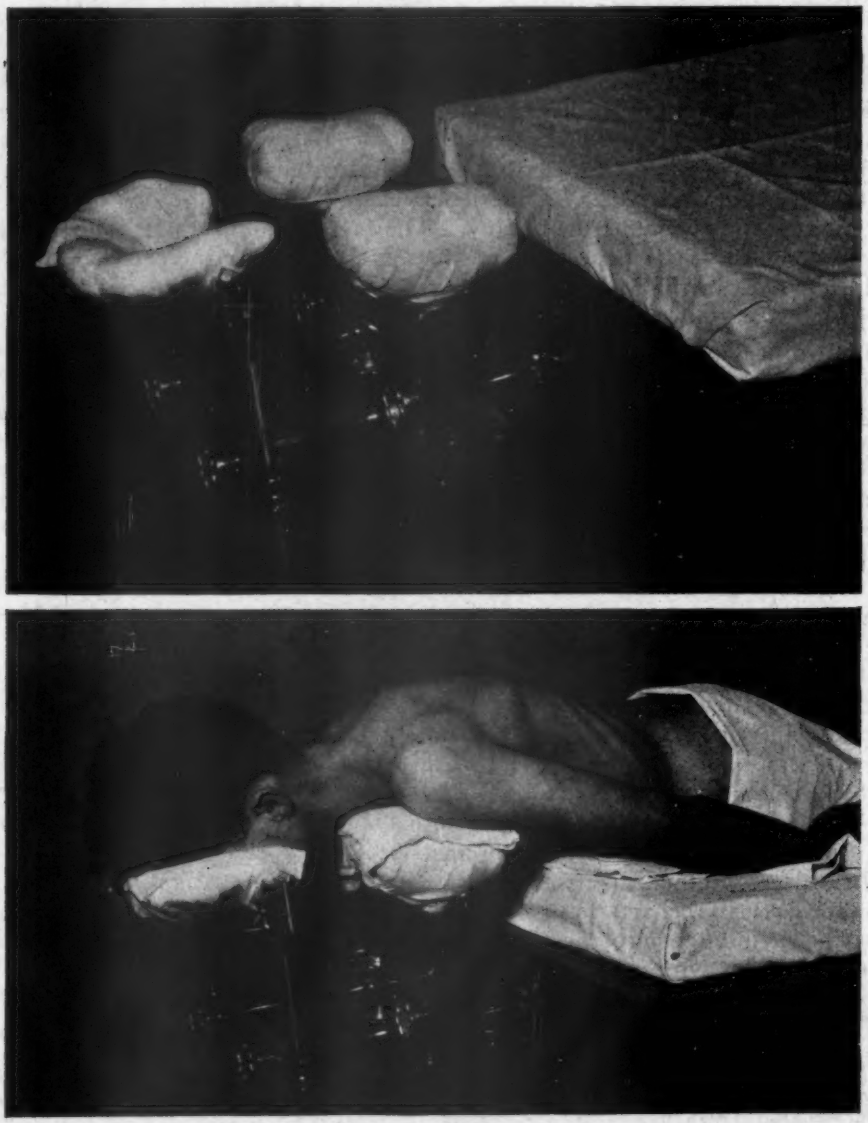

Fig. 1. — A King head rest from a Universal operating table attached to a physical therapy treatment table. The head rest is adjustable in all directions and has adjustable shoulder supports. The use of the head rest adds to the patient's comfort and allows correction of deformities while treatment is being given. (Courtesy of the American Sterilizer Co., Erie, Pa.)

tempted until all studies are completed and roentgen ray therapy has been given. The ray therapy gives early alleviation of pain with relief of muscle spasm and allows more rapid and less painful correction of the deformities. On relief of symptoms or after completion of one series of roentgen ray treatments as outlined in chart 4, corrective measures as listed in chart 5 are started and physical therapy measures are begun. To carry out the

physical therapy outlined in chart 6, it was necessary to develop apparatus to help correct deformities, to help maintain the correction and to prevent unnecessary discomfort to the patient during the treatment. If any real benefit is to be derived from physical therapy measures, the patient must be relaxed and comfortable during the treatment. The patient with Marie-Strümpell arthritis usually has fixed deformities and is difficult to handle on the ordinary treatment table, especially when in the prone position. It was found that an operating table head rest, which is adjustable in all directions and which has attached shoulder supports, could be used to advantage in overcoming this difficulty (fig. 1). (A baseball catcher's mitt makes a fairly satisfactory substitute for the head rest. With the baseball mitt sandbags are used to support the shoulders).[7]

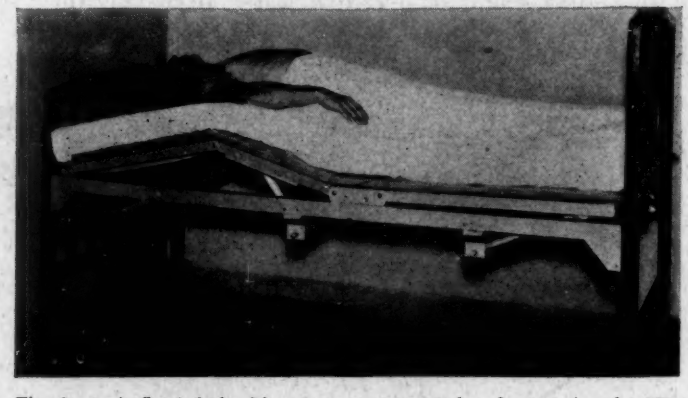

Fig. 2. — A Gatch bed with a latex mattress and a fracture board. The fracture board is hinged to conform to the adjustable bed, and hyperextension of the spine is obtained by placing the patient's head toward the foot of the bed. (From Baker.[1b])

To add to the patient's comfort when he is in a supine position and to aid in correcting deformities, a hinged fracture board similar to that shown in figure 2 was prepared to fit the treatment table.

Figure 3 shows exercise equipment which was designed to aid in the correction of contractures in the anterior portion of the shoulder girdle, the thoracic cage and the abdominal wall and to help in developing the posterior shoulder girdle muscles and the thoracic bundles of the sacrospinalis muscle. In using the apparatus the patient stands against the wall pad and fixes the pelvis with the gluteal and lower abdominal muscles. The body strap is fitted sungly across the back and acts as a fulcrum over which the hyperextension forces act to correct the flexion deformity of the spine and to increase the excursion of the thoracic cage.

Swaim[5] outlined the orthopaedic treatment of ankylosing spondylitis and reported the end results in 106 cases. He pointed out the necessity of maintaining correction of the deformities with some form of support. He used plaster of paris and leather body jackets for such support. In temperate regions such supports are uncomfortable. As a substitute a brace, illustrated in figure 4, was developed. The brace is constructed of 5/8 inch orthopaedic steel. The side bars lie in or just posterior to the midaxillary line and serve to prevent rotational strain of the spine. The manubrial and pubic pads are freely hinged to allow respiratory movement. The pubic pad is made sufficiently large to support the lower half of the abdomen and is held by heavy

7. The author wishes to thank Mr. John D. Riebel for suggesting the use of the baseball mitt.

elastic webbing. The pad, with the elastic webbing, encourages thoracic breathing without causing abdominal distress. Statistical studies of the 172 cases reported by Hemphill and Reeves show that, of the 160 in which a follow-up study could be obtained, 137 (86 per cent) were males and 23 (14 per cent) were females. There were 151 white patients and 9 Negro patients. Eight of the patients were between 10 and 19 years of age, 65 were between 20 and 29 and 58 were between 30 and 39. There were 20 patients between 40 and 49, 6 between 50 and 59 and 3 between 60 and 69. Of the total, 123 patients (77 per cent) were between 20 and 39. Seventy-four per cent of the patients had had symptoms for over one year and 41 (26 per cent) for less than twelve months. Twenty-seven (17 per cent) had had symptoms for one to two years, 26 (16 per cent) for two to three years, 14 (8 per cent) for three to four years, 15 (9 per cent) for four to five years and 41 (24 per cent) for over five years. In making their study Hemphill

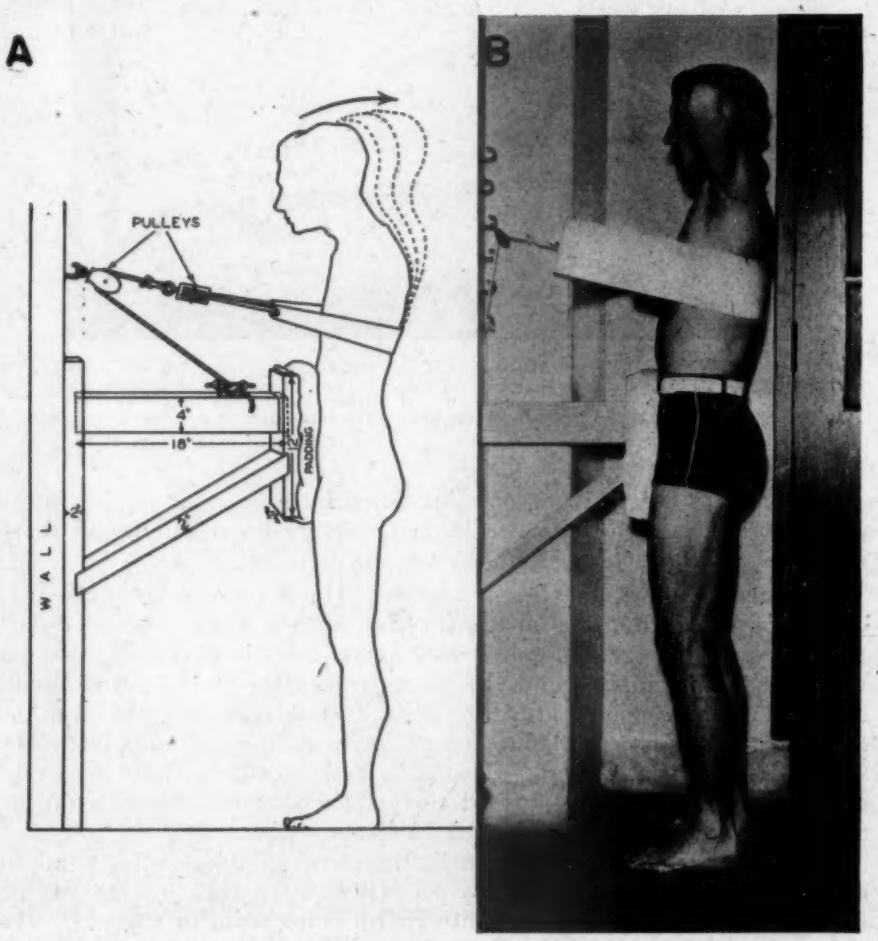

Fig. 3. — *A*, an exercise apparatus designed to prevent hyperextension in the lumbosacral area; to aid in the correction of contractures in the anterior portion of the shoulder girdle, the thoracic cage and the abdominal wall during correction of the dorsal curve, and development of the thoracic bundles of the sacrospinalis muscle and the posterior muscles of the shoulder girdle. (From Baker. 1a.) *B*, use of the exercise machine. Note that the patient's pelvis is fixed by the gluteal, hamstring and low abdominal muscles and is held snugly against the wall pad. (From Baker.1b)

and Reeves divided the patients into three groups. Group 1 had roentgenologic changes limited to the sacroiliac joints. There were 60 such patients (40 per cent). Group 2 had roentgenologic changes which showed partial or complete ob-

literation of the sacroiliac joints, osteitis of the articular facets and slight calcification of the spinal ligaments. There were 58 such patients (37 per cent). Group 3 had roentgenologic changes which showed complete ankylosis of the sacroiliac joints, advanced interarticular destruction or ankylosis

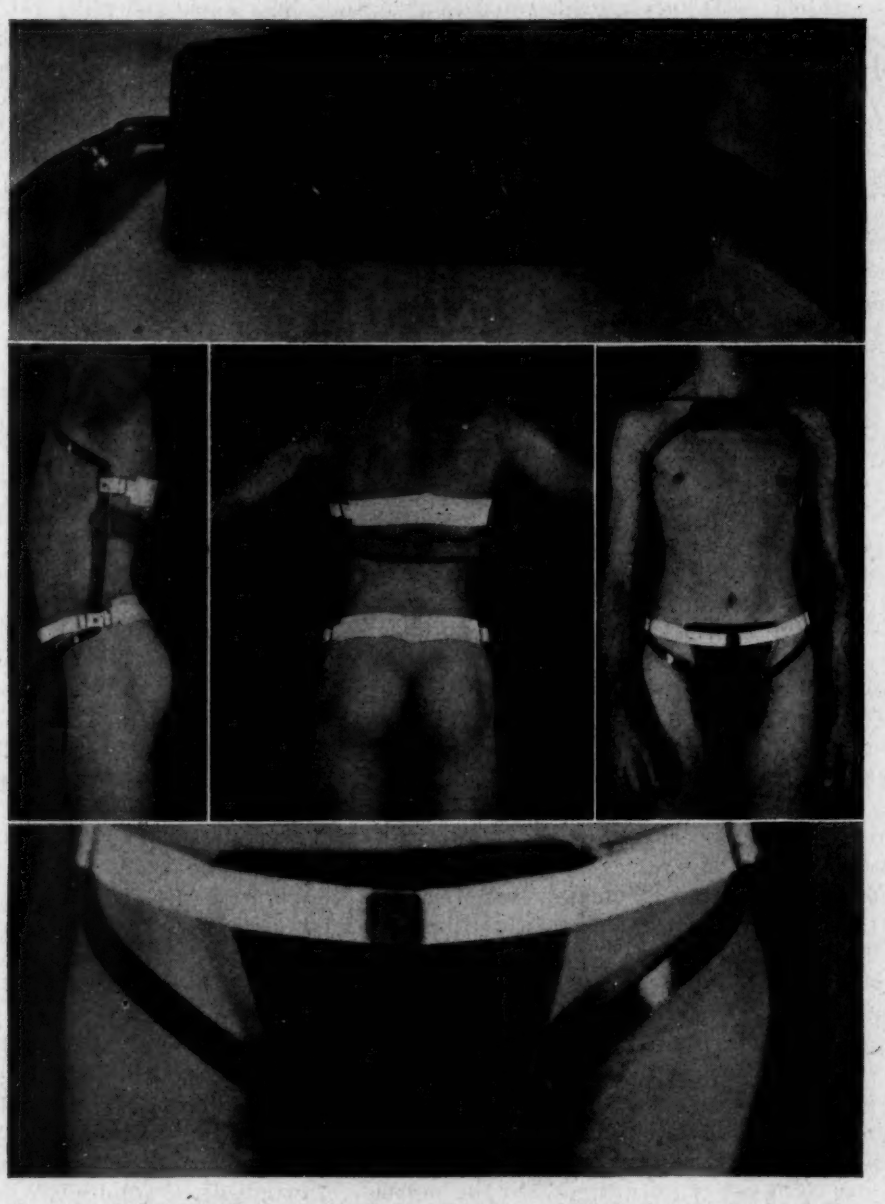

Fig. 4. — A three point hyperextension brace with a heavy elastic band across the dorsal area of the spine to straighten the spine further. Side bars are placed in or just posterior to the midaxillary lines in order to fix the pelvis and thorax as a unit to prevent rotation of the spine. The manubrial and pubic pads are freely hinged to allow respiratory movements. The cross bars are fitted in the pectoral and inguinal regions so as not to interfere with movements of the extremities. (From Baker.1)

of the articular facets and extensive paravertebral ligamentous calcification. There were 38 such patients (23 per cent). Roentgenologic studies of 3 patients with symptoms of less than six months' duration showed nothing abnormal. One patient had had roentgenograms made elsewhere which

were reported to present positive evidence by a competent roentgenologist, and roentgenograms were not made in this clinic.

In the evaluation of results of the combined therapies ten factors were taken as evidence of improvement: (1) orthopaedic measures and physical therapy more easily tolerated; (2) reduction of symptoms, especially pain and stiffness; (3) increase in spinal motion and chest expansion; (4) relaxation of paravertebral muscle spasm; (5) sustained gain in body weight; (6) Weltman's coagulation band approximates normal; (7) sedimentation rate approximates normal; (8) increased red blood cell count and increased hemoglobin; (9) decrease in pulse rate, and (10) ability to return to a gainful occupation. The pain and stiffness were reduced in 144 patients (90 per cent). All 60 patients in group 1 had reduction of pain and stiffness. Of the 58 patients in group 2, 53 (91 per cent) had reduction in pain and stiffness. Of the 38 patients in group 3, 31 (about 82 per cent) had reduction of pain and stiffness. Of the patients, 108 (68 per cent) were able to do more work after treatment. Some of the patients have had no occasion to test their ability for increased activity. Thirteen patients who were bedridden were able to return to a gainful occupation.

As the statistics show, the best results are obtained in the early stage of the disease. Experience with the combined therapy indicates that better results are obtained if the patient is hospitalized until full correction of the deformities is obtained and early signs of return of normal muscle power have appeared. Repeated hospitalization is indicated in most cases. Rehospitalization at three to six month intervals serves to stimulate the patient's interest in his home therapy and has been of benefit in morale building, which is so necessary for patients with this type of chronic disease.

It is difficult to determine the number of series of roentgen ray treatments that will be necessary. Thus far 112 of the patients (70 per cent) have had a total air dose of 450 r, 13 (7 per cent) have had a total air dose of 600 r and 1 has had a total air dose of 900 r, in one series in each instance. Twenty-seven patients (17 per cent) have had two series of 450 to 600 r each. Seven patients (5 per cent) have had three series of 450 r each. There has been recurrence of pain and possibly an advance of the disease in 19 patients (12 per cent). It should be said that among these patients the treatment was not always completed. Several showed marked psychiatric factors, and almost all demonstrated lack of cooperation and enthusism in carrying out the exercises and the other procedures in the physical therapy and home care.

Sufficient time has not elapsed for end results to be evaluated, and it cannot be said whether the roentgen ray therapy is only analgesic or is curative. From some of the follow-up roentgen ray studies it appears that the therapy has had a deterrent effect on the disease, in that there are signs of revascularization and retrabeculation in the subchondral areas about the sacroiliac joints in patients treated during the early stage of the disease. Repeated determinations of the sedimentation rate, when carried out have shown a consistent return toward the normal. Certainly the combined therapy has been of great help in rehabilitating victims of this obstinate and difficult disease.

Appendix

CHART 1. — *Directions for Routine Examination of Patients With Marie-Strümpell Arthritis.*

Complete history and complete physical examination.
Search for Foci of Infection:
Nose and throat consultation.
Dental consultation.
Medical consultation, if indicated.

Urologic and/or gynecologic consultation.
Record:
Height and weight.
Chest measurements: inspiration, expiration.
Vital capacity.
Photographs: Full views standing:
Anterior.
Lateral: extended, natural, flexed.
Roentgenograms:
Anteroposterior, lateral and oblique views of lumbosacral and sacroiliac area.
Anteroposterior and lateral views of dorsolumbar area. Others as indicated.
Multiple, small, well focused films are preferable to large films.
Prepare patient for roentgenograms as follows: Give 15 cc. of milk of magnesia and 10 cc. of cascara the night before and a soap suds enema at 6 a. m. and at 8 a. m. If necessary to clear the bowel of gas give 1 cc. of neostigmine methylsulfate intramuscularly thirty minutes before sending patient to x-ray room.
Laboratory Studies:
Studies should be made of the: hemoglobin; red cell, white cell and differential count; Wassermann reaction; sedimentation rate; gonococcus complement fixation reaction; Weltman reaction; blood calcium, phosphorus and phosphatase content and basal metabolic rate. The laboratory findings are of little aid in diagnosis. The most constant finding is an elevated sedimentation rate. Secondary anemia may be present.

CHART 2. — *Sites of Onset Symptoms and Differential Diagnosis.*

Sacroiliac Area:
Most common site of onset. Characterized by early morning low back pain which is relieved by mild activity but is aggravated by heavy exercise. Produces the so-called "lumbago syndrome." Sciatica is frequently present.
May mimic: Ruptured disk, pars interarticularis defects, postural or traumatic strains, tuberculosis of sacroiliac bones or hip disease.
Lumbodorsal Area:
Frequent site of onset. Characterized by pain at costovertebral angle, intercostal neuralgia and girdle pain.
May mimic: Renal colic, intercostal neuritis, intra-abdominal disease or cardiac disease.
Cervicodorsal Area:
Characterized by recurrent wryneck and inability to rotate the head, associated with fatigue. Usually involved late but occasionally is first area involved.
May mimic: Ruptured cervical intervertebral disk, myofascitis, brachial neuritis, subdeltoid bursitis, scalenus anticus syndrome or cervical rib.
Systemic Involvement: Loss of weight; anorexia and fatigability; lack of enthusiasm and loss of interest in work and play.
"Lying between the fields of internal medicine and the specialties is a borderland into which the patient may stray and be lost to adequate diagnosis and treatment. It is here that the larger number of medical mistakes are made. In this connection we, as internists, have been impressed by the frequency with which Marie-Strümpell, or ankylosing, spondylitis is unrecognized and mistakenly labeled. We are, furthermore, convinced of the importance of considering this somewhat rare malady in the diagnosis of any painful state of the torso or extremities. The dominant symptom is pain. The feature of this pain is its variability and vagueness with which even the most intelligent patient describes it despite its severity. Characteristically it is worse during the last hours of the night. Often the patient is awakened about four a. m. and passes the rest of his time in bed in discomfort." —Herrick and Tyson.[3]

CHART 3. — *Physical Signs.*

Early morning stiffness of the spine and paravertebral muscle spasm, which may exist for several years before roentgenologic changes or bony ankylosis occurs.
Tenderness to fist percussion over the involved area of the spine.
Decreased flexibility of spine. Guarded movements of spine.
Diminution of chest expansion when costovertebral joints become involved and decreased vital capacity.
Muscular atrophy in thighs and gluteal area. Generalized muscular weakness and loss of muscle tone.

Roentgenologic Changes.

Early:
Films may be entirely negative, as stiffness, pain and other symptoms often precede roentgenologic changes by months or years.
Decalcification and mottled trabeculation in the cancellous and subchondral bone about the sacroiliac joints. Early changes are not in the joints but are in the adjacent bony structures. The changes may be localized to a small part of the joint, with the rest of the joint appearing perfectly normal. These are the most consistent findings and when associated with clinical signs are pathognomonic of Marie-Strümpell arthritis.
Mild general osteoporosis of the spine and pelvis may be demonstrated.
Late:
Osteosclerosis of the subchondral area and loss of sacroiliac joint space as a result of the destruction of the articular cartilage.

Trabeculation across the joint space.

Haziness and narrowing of the joint spaces and decalcification of the vertebral articular facets. (Best seen in oblique views.) Intervertebral haziness with intraspinal ossification and bridging. (Best seen in oblique views.)

CHART 4. — *Roentgen Ray Therapy.*

Area: 5 by 15 cm., until entire spine is covered.
Strength: 200 kilovolts.
Dose: 150 roentgen units.
Amount: Daily for three to five days or until a total of 450 to 600 r has been given.
Rationale: Relieve pain. (This it does.) Arrest the disease. (This we do not know.)

CHART 5. — *Ward Care.*

Gatch bed with springs arranged to hyperextend spine (fig. 2).
Hinged fracture board. Latex mattress. Traction if needed.
High vitamin diet. (Caloric intake according to need.)
Accessory vitamins in small doses.
Sedation in sufficient amounts and often enough to keep patient comfortable and relaxed.
Biweekly hemoglobin determinations and white blood cell counts.
Multiple small blood transfusions.
If nausea develops during roentgen ray therapy, fluids given intravenously as needed.
Ward exercises as directed in physical therapy chart.
Occupational therapy. Sun baths.
Reassurance as to disease being self limiting under proper care.
Rationale: Rest, relief of pain, correction of deformities. Improvement of nutritional state. Building up of morale.

CHART 6. — *Physical Therapy.*

Heat: Diathermy, infra-red ray treatment or use of wet compresses.
Massage and passive exercise to obtain relaxation and release contractures.
Active exercise to relax anterior part of shoulder girdle, thoracic cage and abdominal and hip flexor muscles, and to develop posterior part of shoulder girdle and sacrospinalis muscles (fig. 3*A*).
Swimming with effort at arching back. Deep-breathing exercise.
Postural training.
Treatments given twice each day.
Rationale: Relieve muscle spasm. Correct deformities and develop weak muscles to maintain corrections. Increase vital capacity. Improve posture.

CHART 7. — *Home Therapy.*

Continue use of fracture board and firm mattress.
Use three point hyperextension brace (fig. 4).
Continue corrective exercises as directed in physical therapy chart.
Maintain an adequate diet.
Get adequate rest, including at least two rest periods on a flat surface for thirty minutes or more each day. If necessary spend week-ends in bed.
Care for general health. Avoid fatigue and exposure.
Follow recreational and vocational guidance (important).
Rationale: To maintain and increase correction of deformities; to prevent recurrence of pain; to improve general health, build up morale and bring about rehabilitation.

THE CHALLENGE OF CRUTCHES

Methods of Crutch Management

GEORGE G. DEAVER, M.D.

Medical Director, Institute for the Crippled and Disabled

and

MARY ELEANOR BROWN, M.A.

Physical Therapy Technician, Institute for the Crippled and Disabled

NEW YORK

Crutches are wooden objects used to support the body. Sometimes they are needed only temporarily, while a mild injury, such as a broken bone or a sprained part, is on the mend. Often, however, they are indispensable lifelong aids to the disabled as they go about performing the necessary everyday activities of walking and traveling, taking care of themselves and using their hands in daily occupations. The wooden objects of the sportsman are his tennis rackets and golf clubs, his skis and ski poles, the paddles of his canoe and the oars of his boat. Just as the sportsman views his sports' implements as aids to accomplishing his skilful activities, so the modern boy or girl or man or woman who has been injured or ill looks on his two wooden props as tools for the accomplishment of the skill of crutch management and not as formidable objects to be feared and dreaded.

Neither the sportsman nor the crutch walker can acquire skill with his wooden objects without preparation and practice. Therefore, the crutch-walking beginner must not expect or be expected to seize a pair of crutches, rise from a bed or wheel chair and dash off triumphantly at a normal rate of speed. In order to learn good crutch walking, one must follow a systematic program with competent instruction. This program should include a muscle test to judge the subject's joint movements and strength, exercises to develop the muscle groups needed for crutch management, proper selection of the crutches to be used, correct measurement for the crutches, determination of the crutch gaits suitable to the disability and selection of the best methods the subject should use in performing everyday activities.

The modern crutch walker can become efficient on crutches if he is willing to follow such a program, step by step, under the direction of the instructor, amassing simple knowledge, using common sense in the application of that knowledge and persisting unrelentingly in regular practice. In fact, it is possible for him to become so much the master of his crutches that they are extra limbs almost as sensitive and obedient to the will of their owner as if they were actually a part of him.

An example of crutch mastery is displayed by Arnold S., a 14 year old boy who was born with a spinal cord lesion. He was destined to have no movement or sensation in the lower extremities, so that his only hope of walking was with braces and crutches, which he learned to use at the age of 2. Arnold walks forward as fast as he can. Suddenly he is commanded to stop and turn around quickly, which is a real test of facility on crutches. He discloses an amazing dexterity in the use of his crutches, which have so much the appearance of belonging to him that they give the impression of extra appendages as he makes the most delicate adjustments to move efficiently while at the same time keeping his balance. Miss Wilhelmine

Wright[1] referred to a boy who could "turn a corner on one crutch with the other crutch and both feet whirling through the air." Such is the highly skilled quality of the art of crutch walking, the attainment of which should be the aim of all crutch walkers.

Some Crutches of the Past

The history of the crutch is best chronicled by centuries of ancient and medieval art.[2] In 2830 B. C. an Egyptian workman was hired to put the symbolic designs on a tomb. He chose as one of his subjects a gentleman leaning on a stick, shoulder high, surmounted by a cross piece. This Egyptian gentleman's walking stick is the first known crutch. Since then fat men on heavy canes and thin ones on knotted sticks have been limping their ancient ways along the walls and ceilings of Egyptian caves. Dating back to 800 B. C. is the famous first poliomyelitis case on record, cited in many references on this subject.[3] The afflicted youth, an Egyptian high priest, carries a crystal-capped staff but is so occupied with other priestly objects that he appears to be leaning on it very slightly. Other artefacts of long ago are the mirrors, vases, door panels, illuminated manuscripts and old tapestries which picture warriors resting on fancy staffs, patients on crook-like shepherd's sticks, fifth century Greeks with cowhorn crutches and legless citizens resting in bowls as well as others who progress on crawling blocks, the precursors of the wheeled platform of today.

The wealth of realistic paintings, statuary, drawings, cartoons, etchings and charms as gathered together by Hans Würtz[4] bears witness to the many weird contraptions worn by the disabled of long ago, as well as the variety of sticks of all lengths which they used directly both as supports to take the place of lower extremities and as crutches for the upper extremities.

"The idea of crutches undoubtedly came from the stilts which ancient soldiers used to scale walls from the tops of which they rained stones on the heads of defenders," is the quaint statement of an artificial limb maker.[5]

The single crutch with a cross piece on top was in common usage until the eighteenth century, when the invention of the saw permitted the single upright to be split into a double bar crutch and a cross piece was placed on top, with cross pieces for the hands inserted between the uprights at hand level. Although this is the crutch which has proved the most practical and is the most commonly used today, nevertheless the medical literature contains descriptions of many kinds of perfected crutches which have been developed and patented, as well as of devices for special conditions involving the loss, partial loss or paralysis of one or more limbs.

A ball and socket crutch has been described[6] which has a fixed underarm piece with a ball and socket arrangement below it. There is no movement of the underarm piece against the armpit and, reportedly, no friction, so that sores under the arm, caused by the crutch tops moving backward and forward, do not develop. The top is apparently constructed of some pliable material, since the suggestion is made that if it is blown up with air it can be made more comfortable. Another author[7] devised a crutch top made of hollow rubber tubing which encircles the upper extremity at the shoulder joint.

1. Wright, Wilhelmine: Crutch-Walking as an Art, Am. J. Surg. 1:372, 1926.
2. (*a*) Epstein, S.: Art, History, and the Crutch, Ann. M. Hist. 9:304, 1937; (*b*) The Crutches of Yesterday, Hebrew M. J. 1:201, 1938.
3. International Committee for the Study of Infantile Paralysis: Poliomyelitis, Baltimore, Williams & Wilkins Company, 1932, frontispiece.
4. Würtz, Hans: Zerbrecht die Krücken, Leipzig, Leopold Voss, 1932.
5. Thomas, H. H.: Help for Wounded Heroes: The Story of Ancient and Modern Artificial Limbs, London, Essential Artificial Limb Co., 1918, p. 9.
6. Thorpe, H. H., and MacColloch, R. E.: Ball and Socket Crutch, Post-Grad. M. J. 13:291, 1898.
7. Childs, T.: Improvement in Crutches, Am. M. Times 1:166, 1863.

A patented adjustable spring crutch was described by Lewin[8] as a solution to the necessity for individually fitted crutches. Not only can these crutches be adjusted with regard both to total height and to height of the arm pieces, but their shock-absorbing recoil springs lessen the impact of each step, especially on stairs, hills and curbs, where body drops are marked. Each crutch is in two sections, which do not come apart, one piece telescoping into the other at the selected height determined by the insertion of the plugs.

A rolling crutch has been described[9] as having an arclike rocker at its base which is a reproduction of the curved underarm top of the crutch. Such a rolling crutch permits direct participation of the upper extremities and shoulder girdle in the entire forward step and results in a "long, easy, efficient step." The author also suggested a rolling cane. This crutch and cane might prove a hindrance in stair climbing, although the author gave instructions in their use for this purpose.

The Waraha crutch was supplied by the Red Cross to many soldiers in the World War of 1914-18.[10] "The shoulder cross-piece rests on rubber cushions, and is adjustable, so that jolt and armpit troubles are lessened, and the handle is adjusted to the length of the arm." This is a single upright crutch.

The invention of a "saddle crutch" [11] is evidence of an attempt to carry a part of the body weight by some means other than the exclusive use of the shoulder girdle and upper extremities. A saddle-like apparatus is strapped between the crutches, fitting underneath the trunk, the weight of the body being partially borne by it and transferred to the crutches.

An interesting mechanism has been described by a Frenchman.[12] This is a contraption which can be attached to any crutch and by the manipulation of which the lower extremities can be advanced. The author described a crutch stance which involves carrying the center of gravity over the center of a quadrilateral formed by the two crutches and the two feet. The subject starts to walk by shifting his weight to one side, freeing one of his own limbs from weight. He then leans on the lever attached to the crutch on the side of the limb to be lifted and the limb is lifted forward on it. It is believed that he next moves the crutch on the other side forward, this movement being followed by a similar maneuver to advance the other limb.

A crutch holder for a subject with a hand amputated has been improvised by a German.[13] This is a device for hooking the bandaged stump onto the crutch hand piece.

In 1915 the French wrote about some new crutches brought back by the French soldiers who had been prisoners in Germany. One author[14] described three kinds of adjustable crutches. The simplest of these contains a wooden extension piece, with holes at different heights, to be inserted vertically at the bottom between the two uprights. The two upright side pieces of the crutch also have holes pierced in them. Thus one can adjust the crutches to the right height by moving the extension piece up or down and fastening it tightly at the desired height by means of the screws through the holes. The cross pieces for the hands to grasp can also be adjusted because there are holes at different heights in the central region of each upright through which screws can be placed.

8. Lewin, P.: Adjustable Spring Crutch, Bone & Joint Surg. **10**:819, 1928.
9. Hall, R. G.: A Rolling Crutch, J. A. M. A. **70**:666, 1918.
10. Stuart, Sir Thomas A.: Artificial Limbs, Sydney, Australia, Gullick, 1917, p. 7.
11. Taylor, J. R.: A New Saddle Crutch, M. Rec. **24**:136, 1883.
12. A Crutch Which Enables a Paraplegic to Walk, Corres. and Notes, Lancet **1**:296, 1920.
13. Reiniger, M.: Behelfsmässiger Krückenhälter für Handamputierte, München med. Wchnschr. **63**:1029, 1916.
14. Rouquette: Béquilles et appareils de prothèse, Rev. gèn. de clin. et de thérap. **24**:794, 1915.

Crutch paralysis is a condition dreaded by crutch walkers. It develops from taking too much of the body weight on the shoulder pieces. In the armpit the nerves are near the surface, and if there is too much constant pressure painful paralysis results. In an effort to alleviate this condition, a type of short crutch was described[15] which fits tightly against the rib cage, thus freeing the armpit from the danger of weight bearing.

Another kind of crutch which allows support on parts other than the armpit is really an extended cane.[16] It has a single upright with a hand rest at right angles to it and an extension piece above the hand rest attached at an angle of about 125 degrees to the upright and bent away from the body. This extension piece reaches to the middle of the forearm and contains a holder at the top which fits around the forearm. The weight of the body can thus be taken on the hands and the backs of the forearms. This kind of extended cane is nowadays often called an "English cane."

A variation of this crutch which is seen today by persons teaching disabled subjects is composed of two uprights which extend to halfway between the elbow and the shoulder. There are a cross piece for the hands and a curved upper arm part against which the subject leans his upper arm. This crutch does not give the support that the double bar crutch with shoulder piece gives against the trunk and under the arm. It is used usually by subjects whose main disability is weakness across the back of the elbow. Crutches of this type have been called by two names: the "California crutch" and the "Canadian crutch."

Of all the crutches described, the double bar crutch with shoulder and hand cross pieces, in the adjustable extensible form as well as in its permanent counterpart, is the most practical and most used today.

Modern Crutches: Their Accessories and Measurement

Underarm crutches with double uprights and hand bars are the most commonly used crutches today. Since it is not always evident at once how long a pair of crutches should be and just where the hand bars should be, it is wise to begin with a pair of extension crutches. An extension crutch consists of two vertical uprights and one vertical piece containing a series of holes which is inserted between the two vertical uprights and adjusted by means of bolts and screws. The hand pieces can also be changed, since there are holes in the vertical uprights with bolts and screws for adjustment.

Each shoulder cross piece should have a rubber cover over it, since paralysis may result if the subject leans too heavily on the hard wooden surfaces of the crutches. This may be tied on with bandage or otherwise attached so as to prevent slipping. Adhesive tape should not be used against the top, since it spoils the rubber. A small cover may be made out of any ordinary cloth and tapes sewed on it. This may be placed over the rubber top and tied under the shoulder cross piece; thus it anchors the rubber top and at the same time can be removed and replaced easily. It is advisable to line such covers with ordinary dress shields if the subject needs to be careful about perspiration.

In order to assume the proper crutch position the subject should take the weight of the body on the hands and not on the shoulders. Nevertheless, crutch tops are essential, since the way to rest the hands while crutch walking is to stop, take the weight of the body on the shoulders, take the hands off the bars and shake them to relax them. There are persons who cannot take the weight of the body on the hands because of weakness, fusion,

15. Epstein, 2b, page 201.
16. Ripert: Le béquille, Rev. d'orthop. 9:481, 1922.

amputations or involuntary motion. Such conditions require the subject to lean on the tops of the crutches.

A rubber tip should always cover the base of each crutch to discourage slipping of the crutch and fear on the part of the subject. It is essential to procure large heavy rubber crutch tips. Small thin tips do not afford the suction necessary to give the subject full confidence in his crutches. Small thin crutch tips are satisfactory only while the crutches are held perpendicular to the ground. Their contact with the ground decreases as the angle of the crutches is increased, and slipping results. The best crutch base covering is one that has a suction surface of at least 1½ inches, which will remain in contact with the ground no matter at what angle the crutch is placed.

In adjusting crutches, the height of the crutches and the level of the hand bars are primary considerations. If crutches are too long, they force the shoulders up and the subject has no way of pushing his body off the floor. If crutches are too short, the subject leans over too far and stands poorly. The height of the crutches and the level of the hand pieces depend on the extent of the disability, the strength of the muscles needed for crutch walking, the amount of weight the crutches must carry, the crutch gait selected and the skill of the subject in manipulating the crutches. However, there are numerous opinions on the subject.

One writer stated:[17] "A good rule for measuring crutches is to measure the distance from the patient's axilla to the floor and add 2 inches to this length. The extra 2 inches makes the crutches the proper length when they are placed out to the side." The same author gave the following information about the placement of hand pieces: "When the hand pieces of a crutch are in the proper place, the patient has the wrist in extension, weight on the palm of the hand, and the elbow very slightly flexed."

Another author[18] indicated that "crutches should measure the length from axilla to heel, plus 4 inches; the handle bar should be about 4 inches less than the inside length of the area from the top of the crutches." Another opinion[1] concerning the placement of the hand pieces is that "the distance between the top of the crutch and the hand piece should be such that by bearing down hard on top of the crutch with one's armpit the wrist can be flexed to a right angle under the hand piece." This author also stated that "for the more helpless patients who use the rocking method, the crutches must be longer."

A short cut for determining the length of crutches is given in the following quotation:[19]

> The ordinary method of fitting a pair of crutches to a patient as a rule resolves itself into a laborious task of taking several pairs of crutches to the patient and by actual trial seeing which pair will fit.
>
> A large dealer has figured out a short-cut method which should be of considerable assistance to hospital executives and physicians, either in fitting crutches from stock or in ordering crutches for special cases.
>
> This dealer has taken an average of patients' height and the average length of crutches used for a large number of cases and finds that the proportion between a man's height and the length of crutches suitable for him is 77 to 100. In other words, given the height of a patient, the proper length of crutches will probably be 77 per cent of the height.

17. Nelson, Doris: Crutch Walking, or How to Teach a Patient to Use Crutches, Am. J. Nursing 39:1088, 1939.

18. Mahoney, Helena T.: The After-Care of Poliomyelitis: III. Teaching Coordination and Balance, Am. J. Nursing, 32:14, 1932.

19. Determining the Length of Crutches, Special Sect. Mod. Hosp. 15:332 (Oct.) 1920.

The following quotation is from a recent article on crutch walking:[20]

> One method, with the patient lying straight in bed, is to measure from the anterior fold of the axilla to a point 6 inches out from the side of the foot. Another method is to measure from the anterior fold of the axilla to the foot and add 2 inches. Orthopedic appliance supply houses sometimes suggest taking the height of the patient and then subtracting 16 inches. This may not always be accurate, as relative proportions of individuals differ.

The method we use is to help the subject to stand up against a wall as straight and as tall as he can, with shoulder girdle relaxed and not raised, upper extremities relaxed and at sides and heels against the baseboard. He may have to be supported. If the subject cannot stand up against the wall for measurement he should lie down on his back, and the measurements should be made with just as much care, especially with regard to the position of the shoulder girdle and upper extremities.

The procedure is to measure the distance from the armpits to the floor. The best way is to make a pencil mark on the wall at the armpit. Care should be taken to make the mark with the subject's shoulders down. Patients are apt to raise their shoulders, in which case the mark is higher than it should be. The distance from the mark to the floor should be measured with a tape measure. This measurement must be considered to include the rubber tops of the crutches as well as the rubber bottoms. Since shoulder cross pieces are not straight across but slightly concave to fit the armpit, the measurement must be thought of as extending from the center of the shoulder cross piece. If the measurement is made from either end of the cross piece, the distance will be greater.

Once the measurement has been taken, the extension crutches, fitted with rubber bottoms and with rubber tops attached securely by means of covers, may be adjusted to the determined height by manipulating the extensible piece of wood inserted at the bottom of the crutches and then fastening it securely.

The next problem is the height of the hand pieces. These should be adjusted so that the subject's elbows are bent to an angle of about 30 degrees from the vertical when he is standing up straight, with his hands strongly dorsiflexed and grasping the cross pieces and his weight on his hands.

As the subject becomes accustomed to his crutches, the height of the crutches, as well as of the hand pieces, may be changed to suit his individual needs. When the instructor and the subject are convinced that the crutches are correct, permanent crutches without the extension pieces and thumb screws, should be made to the dimensions of the extension crutches. The reason for replacing the extension crutches is that plain crutches, with no extensions, are lighter and better looking.

Although the idea of extension crutches is an excellent one, certain difficulties may be experienced in their selection and adjustment. They are made in three sizes, adjustable within the figures given: child size, 26 to 35 inches; youth size, 35 to 47 inches, and adult size, 48 to 60 inches.

Extension crutches cannot be made any shorter than the two vertical uprights. The way to tell exactly how short a crutch can be made is to measure the vertical uprights and then add 2 inches, since that allowance must be made for crutch bottoms. This information is important when it comes to ordering extension crutches. It is often difficult to obtain extension crutches which can be made short enough.

A further difficulty is the choosing of adjustable crutches for a subject who has a large trunk, long upper extremities and big hands but undersized

20. Olmsted, Lois: Crutch Walking, Am. J. Nursing 45:30 (Jan.) 1945.

lower extremities. The hand pieces of the various sizes of extension crutches differ in length, the child's size being much narrower, to suit a child's hand. The type of subject described may need a youth's or child's size crutch as far as height is concerned but an adult size hand piece. There is no such combination. The only thing that can be done at the present time is to buy adult size crutches to get the right size hand pieces and then have the two vertical uprights, which govern the height of the crutches, sawed off.

In the case of a tall man for whom the adult size of extension crutch is not high enough, a longer piece needs to be inserted at the bottom.

Extension crutches are not always entirely standard, since those from different manufacturers vary within small limits. The holes for adjustment do not always fit perfectly, and new ones may have to be drilled. The adjustment of extension crutches may take a little time, and it is suggested that oil for the screws, a screw driver and a hammer be always kept handy.

It is most emphatically urged that the method of measurement described be followed when starting a subject off on crutches. If an error is made, it is much better for the subject to start with crutches which seem a little low than to start with ones that are too high, even if the extra height is only an inch. In this case the subject will become so accustomed to the wrong height that it will be hard to make him correct the habit. However, great success will be attained if the method outlined is followed strictly from the beginning.

EDITOR'S NOTE: This is the first of a series of articles, of which the subsequent ones will also appear in the ARCHIVES.

SOME EFFECTS OF THE WAR ON MEDICINE *

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NEW YORK

When I was invited to address the American Congress of Physical Medicine, it occurred to me that it would be good medicine for a layman to set himself the task of showing what progress had been made under the pressure of war in medical research, technical skills and the application of new physical and chemical measures to the diagnosis, prevention and treatment of disease. Presently I realized that this was not a layman's job—that only a gifted historian, technician, clinician or practitioner could properly appraise what progress medical science, as distinguished from medical art, has made under the accelerated necessity of war. It seemed more appropriate for a layman who had observed tendencies in medical education and practice for two generations to comment on what he saw taking place in the broad field of medicine, and perhaps venture to prophesy where these tendencies might lead us after the war.

We are often shocked to find how little the war has changed our manner of living. We wear the same kind of shoes, eat the same food, drink the same drinks, see the same movies, buy the same furniture, read the same papers, vote the same ticket that we did before the war. We have even observed a balanced industrial life—the only difference being that we have superimposed a war industry on a domestic economy and maintained them side by side. It is true that we and our children have been forced to change vocational direction and that scarcely a family in the nation has not faced new reality in some sphere of life, but outwardly we are the same people in war and in peace. Only the young and those who have felt the grim tragedy of life and death and pain, those who have stood on the rim of the universe and seen new worlds whirling in space and time and crashing to the earth, will be changed—physically and mentally. For millions there will be no change. For the most part those who were cruel will be cruel still, those who were selfish or dull or thoughtless or small will remain the same, while those who were generous or brave or progressive or spiritually minded will continue to exemplify these qualities in a changing world.

In the last sentence I have admitted that some changes have taken place This is true, and it is in spite of personal sameness. We are riding on one of the great swelling waves of feeling and thinking. To quote Tennyson: "Such a tide as moving seems asleep, to full for sound or foam, when that which drew from out the boundless deep." This vast movement of thought and feeling is carrying on its bosom the destiny of countless people who are unconscious of what is taking place. They are a part of the movement of economic and social and spiritual change, but they do not know "whence it comes or whither it goeth" or what it means. And for the most part they do not care so long as they live very much as before. What they do not know, what they cannot feel, does not hurt them, and on what shore they eventually land does not especially concern them.

Now the man from Mars—in this case the layman sitting at the gate and watching the medical profession pass by—a profession that has been irresistibly drawn into the vortex of war—what does he see? He sees many things which for lack of a better word are called tendencies. As an observer,

* Read at the Twenty-Third Annual Session of the American Congress of Physical Medicine, Cleveland, Sept. 8, 1944.

I mention some of them without attempting to appraise them—to criticize them or to praise them. There is no order of importance implied, or any long range interpretation involved.

Let me mention first women and medicine. To be sure, it is hazardous enough to predict what one woman will do, let alone a whole profession or procession of women. I am almost as much at a loss to predict what will happen to women in the profession of medicine as I once was when a freshman asked me how much it would cost to get a coeducation. Broadly speaking, women in America have not been welcomed into the medical profession. Medical schools did not want to admit women because it was expensive to train them and then most of them married or left the profession for other duties. Men prefer men physicians, and most women do also. About 5 per cent of the prewar 180,000 physicians were women. In contrast, about 50 per cent of Russian physicians are women.

Women have proved that they can do practically everything that men can do in industry, commerce, transportation, the professions and about everything else. If women really want to enter the medical profession in greater numbers, this is their opportunity. Places are vacant in the medical colleges. They are greatly needed now and will be more valuable as socialized medicine takes deeper root in American life. Moreover, there is more encouragement for women to combine domestic and professional careers than before. It is true that women raised a great hullabaloo early in the war because they were not granted commissions by the armed services, but when the way was opened they were conspicuous by their absence. I am not sure what women want to do about the medical profession, but if they want emancipation, this is the hour for them to obtain it. The war has set the gates ajar. Personally I hope that women will enter the medical profession in greater numbers and become more influential in the profession.

I referred a moment ago to socialized medicine. That is not a very good phrase. The connotations are bad. I should have said equal opportunity for medical care. Theodore Roosevelt once remarked that no condition is good for any of us unless it is good for all of us. I suppose he meant that no social or economic monopoly on the good things of life is safe for those who have it unless they try to make them available for all—whether it is health or music or food or freedom or land or stars. Of course, one does not imply that all men have equal ability to secure or use or exploit or value any of these gifts of life; one means rather that according to every man's need and capacity these riches of the earth shall be made available to him. They shall be made so by the simple addition of fraternity to liberty and equality. This is basic human mathematics.

Unfortunately, in the field of health this has not been true, in spite of the fact that no profession has been so generous with its talents and skills as the medical profession. One difficulty is that the physicians have been better scientists than economists, and so they have been on the defensive to save their economic hide while giving away their services for the sake of running their own professional show. Another reason is that they have too frequently selected the wrong leaders—men who had to be driven into acceptance of the inevitable instead of seeing what was coming and assuming leadership or at least getting out of the way and letting men lead who could read the handwriting on the walls of destiny.

Still another reason is that there are always politicians around who are clever enough to use any sort of reform cry to feather their nests, whether or not it hurts the profession involved or helps the forgotten man. Hiding behind the word reform, like Ben Jonson's rascals, politicians are attempt-

ing to force physicians to accept public supervision of medical care. Physicians are too busy healing people to compete with demagogues, and so their professional status and leadership in the great scheme of public health may be at least partially lost.

Another reason why we have been slow to provide the basic essentials of public health and medical care under sound laws that would protect both the patient and the medical profession is the pathetic lack of leadership and responsibility on the part of the great state and private institutions which for the most part own and conduct medical schools. It might be thought that at least in the field of physical and mental health, medical schools and all higher institutions would cooperate and work together for great and good ends, but one looks in vain for any such united leadership at any level of the educational ladder and especially from the state universities.

One is reminded of a famous passage in Morley's life of Gladstone, in which the great statesman, looking back, toward the end of his public career, on the social progress that had taken place in more than sixty years, remarked that the reading of history and his personal experience forced him to the conclusion that the great social and economic changes that had benefited his people were not the result of the initiative and leadership of the wealthy or educated but had been pressed up from below by the masses, who gradually became aware of their power to secure for themselves by legislation or force what the more fortunate were not willing to share with them voluntarily.

The following article, which appeared on the editorial page of one of America's leading daily papers,[1] expresses fairly the public attitude on this great economic medical problem:

To provide the best possible diagnosis and treatment, especially where expensive equipment is required, and to reduce the cost of serious illness to the individual, Vice-Admiral McIntire has proposed health clinics provided by the federal povernment.

Vice-Admiral McIntire is the president's personal physician as well as the navy's surgeon general and so his views are certain to have much weight. He apparently visions clinics open to all physicians and patients, where the best diagnostic equipment and special therapies are available at the least cost. Such clinics are now serving all men in the armed services, of course, and Vice-Admiral McIntire has doubtless been impressed by their value and accomplishments.

In many cities, and some smaller communities, such clinics are available to those who can afford their services. They are also available to charity patients. The Kellogg Foundation has demonstrated in Michigan that the small town laboratory, with a single technician, can materially reduce costs of X-rays and other similar services simply by eliminating travel time and expense for doctor and patient.

It is in the field of prevention, diagnosis and early treatment that our private medical practice has been weakest. Only a tiny fraction of our population now gets regular physical examinations. Too many examinations are superficial or incomplete. There are too many cases of early symptoms overlooked, or laughed off. There is too little referral for further diagnosis or treatment, because of cost or other considerations.

These are not only the criticisms of laymen but the views which many doctors will freely express anywhere but in the public prints. There just isn't enough of the nation's medical skill devoted to keeping people well and to arresting minor illness before it becomes serious sickness.

There are some serious problems in the use of clinical treatment but these can be solved in time. So can the best method of founding and maintaining the clinics be worked out. We do not believe the government should have a dominant voice in medical practice, through control of a national chain of health clinics or otherwise. But the medical profession will have to bring its own service up to date, and meet the health needs of the people, or government will have control. Too many doctors have already stalled too long.

The medical profession is slow to accept innovations in its traditional

1. Editorial, Milwaukee Jr., July 25, 1944.

pattern of education and practice, though it is quick to adapt its scientific skills to emergency situations. It is gifted at relieving the fears of patients but slow to acknowledge fears of its own or recognize that it can learn much from those outside its castle walls. Like many a great individual physician in the long history of human development, it can have others while failing to save itself. As a profession, medicine falls just short of having attained the fine art of self criticism.

If the medical profession will take its rightful place of leadership in the program of human rehabilitation and not permit itself to play a dog in the manger role in plans for the more complete and equitable distribution of medical services, a new chapter in medicine can be written. If, for example, it will meet this national issue with the resourcefulness with which aviation medicine met the emergency demands of war, the nation's health and the nation's gratitude will grow apace. To illustrate, here is an interesting citation from a report of the commanding general of the Army Air Forces to the secretary of war:

> The Air Surgeon's office sets the physical and psychological standards for the selection of men for flight training. It calculates the medical and dental supplies needed in all war theatres, coordinates and purchases aeronautic first aid kits for life rafts and airplane ambulance chests. It directs the evacuation of wounded men (since Pearl Harbor over 125,000 casualties have been flown from combat zones in combat areas). In the Mediterranean Theatre during one year 25,000 men with all types of illnesses and wounds were transported 8,000,000 miles by air with the death of only one patient. Flight nurses are selected and trained in all phases of aerial medicine. Cargo planes have been converted into air transports. Complete hospital services have been flown thousands of miles to combat areas. Aeronautical engineers and medical scientists have cooperated in designing Flying Fortress bombers for the safe use of flying at 40,000 feet altitudes, flying 400 miles per hour. A convalescent training program has been inaugurated at home and abroad, and rehabiltation centers have been etsablished.

These accomplishments show the manner in which medical ingenuity and devotion can plan and execute a difficult program of emergency medical care and physical rehabilitation. Why cannot the same qualities and perhaps some of these particular technics be applied to the spreading of medical care to all areas of American life?

The war has revealed some uncomfortable facts about the mental and physical health of the nation. So far as this is the result of the amount or quality of medical care provided or indicates what is required for the future it bears directly on the subject of this address.

Selective service statistics show that the average age of all men inducted into the army is about 25 years. Negroes constitute about 10 per cent of the total, as they do for the nation. Of all those called up by the draft boards, about 30 per cent of white men and 45 per cent of Negroes were rejected. Only about 20 per cent of those applying for service in the Marine Corps could meet the physical requirements. About 15 per cent of those rejected were rejected for mental disease, 5.4 per cent for neurologic defects and 3.3 per cent for mental deficiencies.

It is too early to pass judgment on these data in respect to the nation's supply of physicians, the deficiencies in public health planning and the widespread demand for more equitable medical care, but the data do furnish a backdrop against which to throw certain other facts.

Whatever may be one's view of the relation between the number and quality of physicians and the health of a nation, one cannot entirely divorce the two. There are in the United States about 180,000 physicians, of whom approximately 135,000 are engaged in active practice. More than 50,000 of these are in military service. Prior to the war there was an average of 1

physician to about 1,000 population; now the ratio is nearer 1 to 1,500. In normal times the variation in medical services ranged from 1 physician to 650 laymen in urban areas to 1 to 2,000 in rural areas.

Meanwhile, the situation with respect to medical education in America has become increasingly distressing. There are sixty-seven approved medical schools in the nation. Annual enrolment is in the neighborhood of 20,000, with about 5,500 graduating each year. The medical course (built on from two to four years of college work) is four years in length, supplemented by a year's internship and frequently one to three additional years of residency or specialization in fields such as surgery, ophthalmology, pediatrics and physical medicine.

From the onset of hostilities the medical schools made available to the armed services their entire facilities and personnel. Practically every department in every medical school suffered the loss of valuable members of its staff through induction—some as high as 85 per cent depletion—while at the same time the armed services were making special demands on the remaining members of the staff. To save time the course of instruction was accelerated from four to two and two-thirds years and the period of internship shortened from twelve to nine months. No one is quite ready to pass judgment on the effect of this speeded-up curriculum on the quality of medical training, but it is known that many of the young men who have submitted to this process of forced feeding desire to return to medical school for further training when the war is over. The fields of specialization have suffered even more than the general practitioner course.

The most serious aspect of the situation remains to be mentioned, however. Early this year, largely because of pressure from the upper levels of the War Department and from local draft boards (as expressed through state directors of selective service), the national selective service (which incidentally is a civilian organization whose officers are practically all in uniform and paid by the armed services, which naturally alters their point of view and direction of responsibility) decided to cancel deferments for all premedical students who were not far enough along in their courses to be accepted for admission to a medical school by July. This affected the careers of about 10,000 young men, who were drafted immediately for military service and not permitted to continue medical training. Even under the more favorable circumstances there would have been fewer physicians after the war than before the war, owing to combat casualties the loss probably being about 3,500 each year of the war. Now that deferments have been discontinued and the Army has cut short its assignment of enlisted men to medical education, the effect on premedical and medical school enrolment as long as the war lasts, and thus on the nation's supply of physicians for the next ten years, will be harmful. From every point of view the action of the Army and national selective service is open to the most serious doubts and will, in my judgment, be regarded in later years as one of the tragic mistakes of the war. Among medical school and university officials, public health officers and informed public officials I have heard only the severest criticism of the restrictive policy now being followed with respect to medical training. It is exceedingly unfortunate that this lack of statesmanship was permitted to cast its long shadow on a profession so intimately associated with the nation's health.

Speaking of the relation of government to medicine, may I call attention to other aspects of medicine which have been affected by the war.

The Journal of the American Medical Association reported that in 1943 there were 6,655 registered hospitals in the United States, 827 of which were

federal hospitals. In 1942 there were only 474 federal hospitals; thus there had been an increase of 353 in one year. The total increase in hospitals from 1942 to 1943 was 310, which means that there had been a decrease of 42 in non-federal hospitals. While this change was taking place, state, county and municipal hospitals all showed a decrease. The number of beds in federal hospitals in 1942, 265,427, had grown to 476,673 in 1943, or an increase of 255,735. Meanwhile, the number of admissions increased from 1,675,722 to 4,032,607. Let us carry this comparison a little further over a ten year period:

	Federal		State		All Others	
	Number	Capacity	Number	Capacity	Number	Capacity
1933	295	75,635	557	459,646	5,585	491,765
1943	827	476,673	531	610,115	5,297	562,466

Of course the sudden increase of federal hospitals is a war phenomenon and would be heartily endorsed from that angle, but I suppose no one would be innocent enough to believe that these federal hospitals will all disappear or be dissolved by veteran, state or private agencies after the war. Undoubtedly some of them will disappear. Others will remain as one phase of the growing participation of government in medical affairs. It is not at all unlikely that in the future many of these hospitals will form the basis for government clinics as a phase of public health administration.

Gradually—almost imperceptibly—the federal government has increased its contributions to public education. During the last decade it has increased about 10 per cent its annual contribution to the budget of higher education in America, while the states have gradually assumed a smaller percentage of the budget. There is no reason to suppose that the same gradual assumption of the cost of medical care will not be undertaken by the federal government.

Another marked effect of the war on medicine has to do with the rehabilitation, conditioning or convalescent care of patients after the usual surgical treatment in hospitals. Partly for economic reasons and partly from custom, patients leave the hospital as promptly as possible after the acute phase of an illness has been treated. This was true in the last war with respect to men injured in armed combat. Today the situation has changed and a new medical philosophy and sense of responsibility has found expression in splendid rehabilitation programs and civilian plans for rehabilitation, including as an integral phase of the whole process emergency surgical care, expert medical care in hospitals and the setting up of reconditioning centers in hospitals and civilian centers, vocational counseling and training centers and industrial rehabilitation programs for persons disabled in industry. All of this should be under the general supervision of medically trained personnel in order that the individual patient may be prepared physically and mentally to undertake productive labor on behalf of himself, his family and society. The chief difficulty is that trained personnel is so scarce.

Another phase of the same broad and deep change of attitude toward the rehabilitation of injured persons is seen in the amazing development of plans for the treatment and placement of men and women injured in war and industry. In the past we have let the handicapped person shift for himself or have absorbed him as best we could in our expanding population and industrial life without paying any particular attention to him except to pity him. Now this attitude is changing. In the first place, we have too many disabled persons in our midst to neglect them, and, of course, the war has greatly increased this number. It is now estimated that we have about

8,000,000 permanently disabled in our population, and 800,000 are being added annually.

The National Safety Council recently issued a statement that, "Our national accident toll is nearly 100,000 killed, 350,000 permanently disabled, 8,650,000 temporarily injured."

But we have been impressed not only by numbers. We have become aware of the wasted productive power of the disabled. Their personal unhappiness and sense of futility at being relegated to the fringes of social, commercial and educational life has impressed us. Also, I suspect that many a keen industrialist has discovered that handicapped persons frequently make an asset and not a liability out of their partial infirmity and that they can and do play a more noble and influential part in the drama of community life than many a so-called well person whose only virtue is that he has two hands and two legs and a good digestion.

In any case, industry, medicine, educational institutions, the church and both federal and civilian agencies have accelerated their efforts to preserve for the individual and society the latent talents and skills of the physically and mentally handicapped—to restore their capacity for employment and social effectiveness. Fortunately there needs to be no sentimentality involved in this change of public feeling toward the handicapped. It is really not a question of trying hard to discover what such persons can do. Rather it is a question of what can't they do, since they have proved equal to almost any sort of task if given an opportunity and regarded as capable of normal activity in a social order that uses all the talents available.

It may be appropriate here to mention two other aspects of medicine profoundly influenced by the war. One I have already referred to indirectly —namely, industrial medicine. I need not dwell at length on this aspect, since even he who runs can read that industry and medicine have arrived at a new understanding. Industry is taking a new attitude toward the care and use of the physically and mentally handicapped. Obviously the physical efficiency of individuals has everything to do with their productive capacity in any industrial enterprise. In part this is a medical problem, and industries that are concerned with getting the largest returns—to say nothing of realizing the advantages of congenial human relations—will give appropriate attention to the general health of their workers and, if they are injured, to their rehabilitation. This involves many things, including statesmanlike provision for the physical examination, the working conditions, the recreational facilities, the placement and the retaining of workers at all levels. This is prevention, education, production and rehabilitation all wrapped together for the good of the individual and industry. Incidentally, if the labor unions would pay a little more attention to all the questions involved in this humane and economically sound approach to the individual lives of their members and less to problems of wages and hours and power politics, they would accomplish all they desire and make both industry and their workers indebted to them.

One other phase of medicine which has received special attention as a result of the war is tropical medicine. Prior to 1940 not more than a half-dozen American medical schools made any pretense at specialization in tropical diseases. Since then our far flung battle line has called into operation all types of medical service in areas about which we knew very little. Physicians have learned rapidly from experience how to deal with tropical diseases, and reports from the front have encouraged several medical schools to strengthen courses in this field. The armed services have used immense ingenuity in developing special courses for physicians about to be hurled

into the front lines in tropical areas. When these men return, they will bring knowledge and experience with them which, added to public sentiment at home, will give added impetus to expanded training in tropical medicine.

Even more impressive is renewed emphasis due to the war on the significance of psychiatry as an element in general medical training and as a field of specialization. So much has been written on this subject in relation to the present war that it seems almost unnecessary to even mention it. One hesitates to repeat the obvious.

Figures have been released showing that about one-third of discharges from the armed forces resulted from mental aberrations in some form. No one has ventured to explain the high percentage of rejections or this startling percentage of discharges on mental grounds, though several authorities have advanced what seem to be good reasons.

The one certain fact is that the war has forced into the open the realization that far too little attention has been paid to the relation of mental to physical life and to the training of medical specialists who can bridge this gap in practical diagnosis and treatment. The medical profession as a whole has been half aware or positively opposed to the necessity for clearer understanding by the general practitioner and highly specialized training for the specialist in this field. Unless all signs fail, one outcome of the war will be vastly improved training in all aspects of neurology and psychiatry for all physicians.

Incidentally, I predict that another indirect effect of the war on medical education will be the further breakdown of departmental lines, particularly in the early years of instruction. Speaking purely as an amateur and curbstone spectator in medicine with some experience in academic life and as a casual reader of American medical history during the last twenty-five years, I feel that our medical education has been passing through a fairly rapid metamorphosis, the first two years becoming more integrated in subject matter, the last two years more dynamic and less tied to textbook routine. The future will strengthen these changes. Lines between subject matter will be less sharply drawn than in the past. The functional aspects of the separate fields will receive more emphasis.

In another realm the experience of war will leave its mark on medicine. I refer especially to the manner in which medicine will respond to the influence of the physical sciences even while it is becoming more receptive to what may be called the unseen, the invisible laws of the mind.

Because of the particular interests of this Congress, I have left to the last what seems to me the aspect of medicine on which war will have its most direct and far reaching influence. I refer, of course, to physical medicine, and in this connection it would be folly for me to try to improve on certain introductory statements in the Baruch Report:[2]

> Medicine based exclusively on empirical use of pills and potions is becoming obsolete. However, medicine based on the precision of physics and chemistry is amply proving its value. The last war is said to have established orthopedic surgery as a recognized specialty. This war may well do the same for physical medicine. Physical agents produce striking biologic responses, including effects on psychic reactions more potent than the effects of many of the drugs gathered through many centuries by trial and error. It seems well to fan over the grist of the past and to select carefully those subjects on which the medical student can best spend the limited period of his training. It seems apparent to the Committee that more attention should be paid to the broad field of physical medicine, which ramifies into so many branches of medical treatment. These newer developments in physical medicine should be organized by the physician and not for him. The manner in which we use the hospitals

2. Report of the Baruch Committee on Physical Med., April, 1944.

and medical schools of today will largely determine the medical future of our people, and it is evident that a tremendously significant contribution can be made by providing, at this time, a completely adequate teaching and research program in physical medicine on a national scale.

This extensive field of medical practice includes the employment of the physical and other effective properties of light, heat, cold, water, electricity, massage, manipulation, exercise and mechanical devices for physical and occupational therapy, in the diagnosis or treatment of disease. Physical medicine, therefore, includes the employment of physical procedures not only for diagnosis but also for prevention of diseaes, especially of joints and muscles as well as for occupational, recreational and physical therapy. The study of spa therapy, of climatology, and of hydrology is also included. The employment of physical agents in the field of industrial medicine, geriatrics (treatment of the aged), treatment of rheumatic diseases, treatment of diseases of the blood vessels, and treatment of diseases of the nervous system is becoming increasingly important. The problems of wartime rehabilitation have vastly increased the need for adequate knowledge of physical medicine on the part of all persons who treat the sick and the disabled.

This quotation reflects the viewpoint of scores of experienced physicians and teachers, who have been given encouragement by hundreds of their medical friends with respect to the present importance and future promise of physical medicine in the hierarchy of medical practice.

Perhaps I may be permitted as a layman to comment that this forthright statement is actually based on a long history of healing which has persisted down through the ages though often obscured by more spectacular forms of medicine. It is only one among the medical arts and sciences which have broken through into the full light of public appreciation in recent years. Orthopedics is another, and so also roentgenology, psychiatry, public health, biochemistry and biophysics, all of which are in their infancy in the medical calendar and all much younger historically speaking than physical medicine.

Psychiatry, for example, rode in on the great wave of public interest in individual mental differences, with psychology as the magic password. Religion, education, business and medicine vied with one another in search of the mysterious fountain which held the secret treasures of the human mind. Amid phrases which often conceal more than they reveal and out of the welter of words and academic guesses, a few pioneer spirits have traced some fundamental ideas which gradually will take form as laws of the mind. On this basis, in relation to physical phenomenon, a new science of the mind will gradually be constructed.

Likewise, on long experience in the treatment of the sick and afflicted by means of physical agents, gradually confirmed by the patient research of physicists, chemists, physiologists, roentgenologists, anatomists, psychiatrists and orthopedists, will be built the solid foundation for physical medicine.

Of course, there will be face making and criticism and confusion and some wholesome jealousy as physical medicine takes its rightful place in the medical curriculum and among medical practitioners. But actually one would be disturbed if this were not the case. I can recall the difficulty chemistry, psychology, the arts, economics and several other respectable college subjects had elbowing their way into an already overcrowded college curriculum. College curriculums have always been full because every department was convinced that it carried the true light of knowledge. President Eliot had to promulgate an entirely new philosophy of education and administrative procedure, known as the elective system, to break open the monopolistic Maginot line of the classics, mathematics and philosophy. The task of physical medicine in penetrating the solid cement wall protecting the medical curriculum is simple compared with the problem of cracking the fortress of the ancient languages fifty years ago.

I can recall vividly heated discussions extending over a year in one college faculty over the question of requiring all students to study mathematics. Week after week the gentle but determined head of the mathematics department, who could pack more illogical statements into a ten minute argument than any one else I ever knew, contended that without mathematical training no one could hope to think and speak logically, which he said was the chief reason for going to college anyway. And as for dropping the mathematics department to make way for a required course in American history or an elective in economics, psychology or art, that would destroy the very foundations of a liberal education.

There are many things physical medicine needs—good textbooks for those specializing in this phase of medicine and technical skill, a vastly increased number of physicians and technicians, reliable and painstaking research, a larger body of trained teachers, clinicians and research scholars, a gradual education of the whole medical profession to the basic facts and procedures of physical medicine by means of good courses in the medical schools. But all these will come in due time.

Even the comparatively low standing of the physical medicine specialist among physicians and the insecure professional future of the physical medicine pioneers should not be a source of anxiety to anyone contemplating the future of this subject. A leaf from collegiate history is encouraging. When the sciences were first introduced into American colleges, a new degree had to be created for persons who majored in this field to make certain that no one would think they were equal to those who received the regular B.A. The B.S. degree indicated an inferior type of education and still does in the minds of many old line classicists, even though it is usually harder to get than the B.A. More recently, colleges have been dropping this special designation and granting only one degree—the B.A.—on the assumption that science majors may actually be getting an education in spite of their mistaken choice of fields.

So it has been and so it will always be with any new and significant venture in education, and so it probably should be. The real question is whether the new field of study or service has anything vital and significant to contribute. If it has, it will survive and grow and eventually receive the recognition and support it deserves. If it has not, no amount of soft words will preserve its life. But physical medicine need not be on the defensive. It need not be anxious or impatient or petulant or overly aggressive. All it needs to do is to continue to grow and improve, making its services so skilful and so indispensable that every section of the medical profession will reach out for its cooperation.

Specialists in physical medicine are now riding on the wave of public recognition after years of faithful pioneering. The war has given them added opportunity and recognition. Their greatest danger will be that of sacrificing excellence and quality to emergency and quantity. This they should not do and need not do. They have a long past and will have a long and distinguished future if they follow the road, the narrow road, of assiduous study, patient research and genuine cooperation with those in other fields of medicine and preserve the spirit of service, which is an essential to greatness in any realm.

MEASUREMENT OF JOINT MOTION *

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MINNEAPOLIS

The importance of the measurement of joint motion (*a*) in diagnosis, (*b*) in progress of treatment, (*c*) in estimation of permanent disability and (*d*) as a record for future comparison is well recognized. Yet these questions arise: How can joint motion be measured simply, accurately and by uniform technic? Can the measurement of joint motion be standardized?

Standardization requires that (1) the principles of motion be defined for all joints; (2) a simple, convenient, inexpensive and accessible measuring device for all motions of the joints be used; (3) landmarks of skeletal parts be defined and used consistently, and (4) the normal range of motion of each joint be understood.

Many instruments have been devised and principles presented.[1] This paper is devoted to a proposed standardization based on the requirements listed.

Ten years ago Knapp[2] set about to develop a method which would be simple enough so that clerical or technical help could make the measurements with a minimum of error, would be accurate with 5 degrees plus or minus on repeated measurements and would have as few variables as possible. These ideals of simplicity, accuracy and uniformity of technic have been aimed for and are gradually being evolved.

During this ten year period in the fracture clinic and in the physical therapy department of Minneapolis General Hospital the measurement of joint motion has been performed by the clerk and the technical staff. During this period a series of joint motion measurements have been recorded for the same joints of the opposite, unfractured member. These measurements of normal joint motion have been compiled for the shoulder, elbow and wrist of the upper extremity and for the joints of the lower extremity. The measurements for the upper extremity will be considered in detail in the section on "Normal Range of Joint Motion."

Principles of Motion

The basic motions of flexion and extension are described on a full circle of 360° in a sagittal plane of the anatomic position. Flexion is the motion that approaches zero, and extension is the motion that approaches 360°, the difference between the two being the range of motion in that plane. Thus the angle of flexion is acute and the angle of extension is obtuse. The range of motion can be seen at a glance. For example, if shoulder flexion was 30° and extension was 250°, the range of motion would be 220°, and it could be visualized at once without further description. Such terms as "hyperexten-

* Read at the Twenty-Third Annual Session of the American Congress of Physical Medicine, Cleveland, Sept. 7, 1944.

1. Cave, Edwin F., and Roberts, Sumner M.: A Method of Measuring and Recording Joint Function, J. Bone & Joint Surg. 18:455 (April) 1936. Wiechec, Frank J., and Krusen, Frank H.: A New Method of Joint Measurement and a Review of the Literature, Am. J. Surg. 43:659 (March) 1939. Schlaaff, J.: New Type of Measuring Fan, Device for Taking Uniform Measurements, Muenchen. med. Wchnschr. 85:369 (Mar. 11) 1938. Schlaaff, J.: Ibid. Zentralbl. f. Chir. 64:1364 (June 5) 1937. Zur Verth, M.: Useful Instrument, Zentralbl. f. Chir. 62:2489 (Oct. 19) 1935. Parker, Jason S.: Recording Arthroflexometer, J. Bone & Surg. 11:126 (Jan.) 1929. McGuinness, Madge C. L.: In Kovács, Richard: A Manual of Physical Therapy, third edition, Philadelphia, Lea & Febiger, 1944.

2. Knapp, Miland E., and West, Catherine C.: Measurement of Joint Motion. Bull. U. Minn. Hospitals Staff Meet. 15:405 (May 26) 1944.

sion," "forward flexion" and "return to neutral" become unnecessary. In recording measurements on a patient's chart it is well to put extension first; then flexion can be subtracted, as is done in recording blood pressure. Extension in degrees would be analogous to systolic pressure in millimeters of mercury, flexion would be analogous to diastolic pressure and the range of motion would be comparable to pulse pressure.

If the shoulder mentioned in the example was measured after an injury, the reading might be 200° extension and 120° flexion, the range of motion being 80°, which obviously is marked limitation. This principle, then, can be applied to all joints that flex and extend, whether the motion is normal or limited.

All flexion motions are forward in a sagittal plane except knee flexion, which is in reverse, i. e. backward in a sagittal plane. All extension motions are backward in a sagittal plane except that of the knee which again is in reverse, i. e. forward in a sagittal plane.

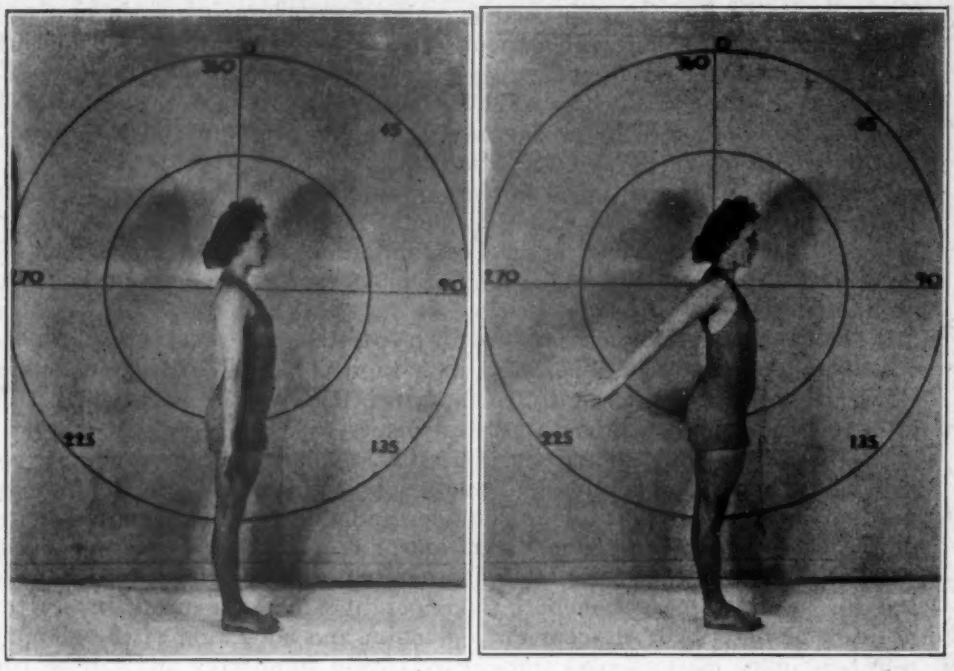
To describe joint motion further, the auxiliary motions must be considered. They are abduction and adduction of the shoulder and hip, external and internal rotation of the shoulder and hip, pronation and supination of the elbow, radial and ulnar deviation of the wrist and eversion and inversion of the ankle. These motions are fairly well described by their titles, but for accurate measurement it is imperative that a neutral, or starting, position be described. Except for abduction and adduction of the shoulder, these auxiliary motions pass through relatively small arcs and can be compared to the motion of a swinging door. The neutral or starting positions of these motions will be described in detail under the heading "Landmarks Defined."

Measuring Device

The goniometer that is used is an inexpensive boxwood carpenter's rule, Lufkin No. 836L. At full length it is 24 inches long; folded once it is 12 inches, and folded again it is 6 inches and easily carried in one's pocket. It has a level and a protractor whose scale is 5° units up to 180°. This protractor scale is small but easily readable—easier than a clinical thermometer. The goniometer is adaptable to all measurements of joint motion. Its cost is about $2.00.

When one is using any goniometer the principle of flexion approaching zero and extension approaching 360° must be kept in mind. The arms of this goniometer are used interchangeably. The stationary arm may become the movable arm and vice versa. For some joints, for example the elbow, the movable arm of the goniometer during flexion approaches zero and gives the reading directly, but for the shoulder joint the goniometer is turned around for the movable arm to follow the humerus. Thus the reading is found to be approaching 180° and must be subtracted from 180° to arrive at the angle of shoulder flexion. Some protractor scales have two rows of figures reading in opposite directions. When that type is used, the reading can be made directly.

For elbow extension the movable arm of the goniometer moves away from zero and usually reaches 180°. A few elbow joints have extension beyond 180°. For these and other joints that extend beyond 180°, the reading is subtracted from 360°. Shoulder extension (hyperextension) is a good example. The reading on the protractor scale, say 120°, is subtracted from 360°, making a final result of 240° extension. Fortunately for ease of figuring, 130° on the protractor scale is equivalent to 230° on the circle, so that readings of 130° are especially simple. The handling and the use of this carpenter's rule is really easier than the verbal description implies.



B. A.

Fig. 1. — *A*, subject standing in anatomic position (lateral view) with shoulder centered on circle. *B*, subject has moved shoulder (right) from anatomic position through its arc of extension backward toward 360°.

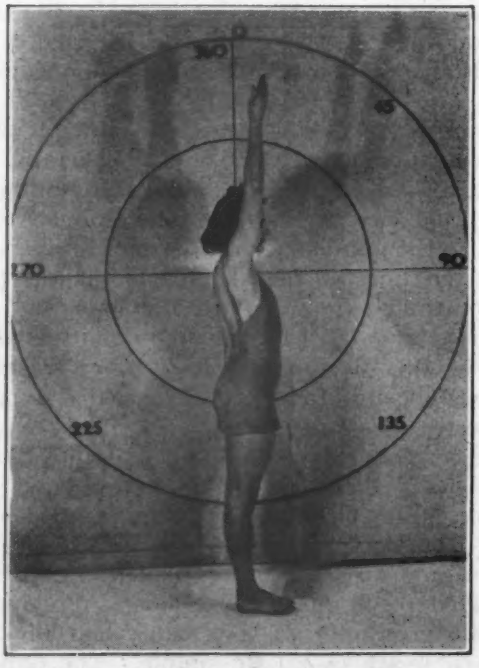
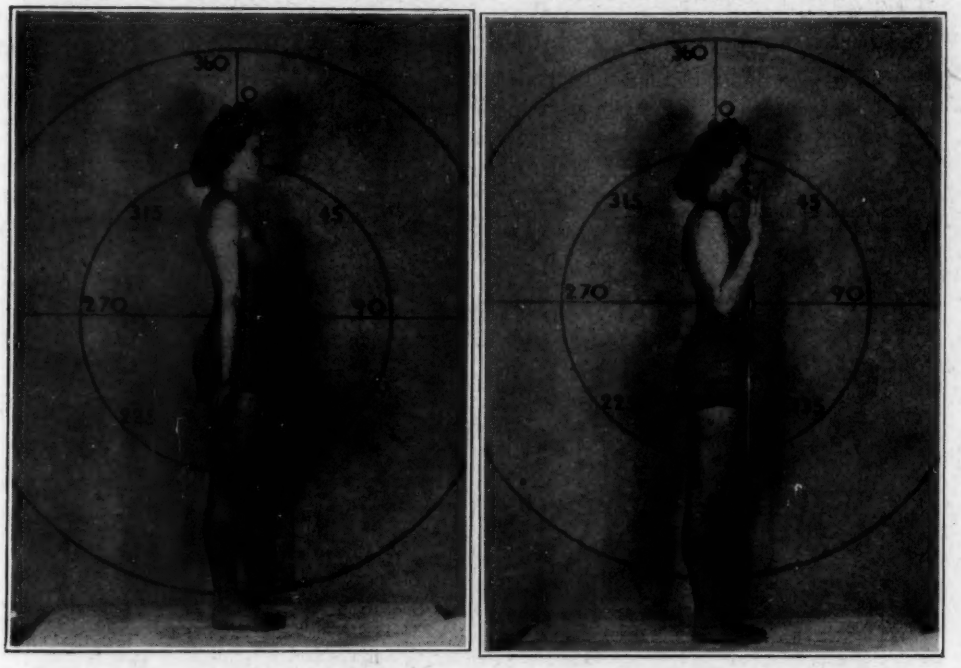


Fig. 2. — Right shoulder in flexion forward toward zero.

Landmarks Defined

"For descriptive purposes the human body is regarded as standing erect, the eyes looking forwards to the horizon, the arms by the sides and the palms and the toes directed forwards: this is the Anatomical Position." [3]

The joints to be defined for measurement are the shoulder, elbow, wrist, hip, knee and ankle. All motions are regarded as starting from the anatomic position unless otherwise stated.



A. B.

Fig. 3. — *A*, right elbow centered on circle in extension. The position is the same as the anatomic position of the elbow. *B*, right elbow in flexion toward zero.

Shoulder Motion. — Shoulder motion can be measured with the subject standing or sitting. If the subject is supine only flexion can be measured; if he is prone only extension can be measured. Motion is described as flexion, extension, abduction, adduction and external and internal rotation.

Flexion: Flexion is the forward motion of the joint in the sagittal plane. The protractor is centered on the shoulder joint (below the acromion); the stationary arm of the goniometer is placed along the midaxillary line of the torso; the movable arm is placed along the lateral midline of the humerus and follows it as it moves forward toward zero of the circle. The reading on this type of protractor scale is subtracted from 180° before it is recorded.

Extension: This is the backward motion of the joint in the sagittal plane. The same landmarks are used as in flexion. The movable arm follows the humerus posteriorly as it moves toward 360° on the circle. The reading on the protractor is subtracted from 360° before it is recorded.

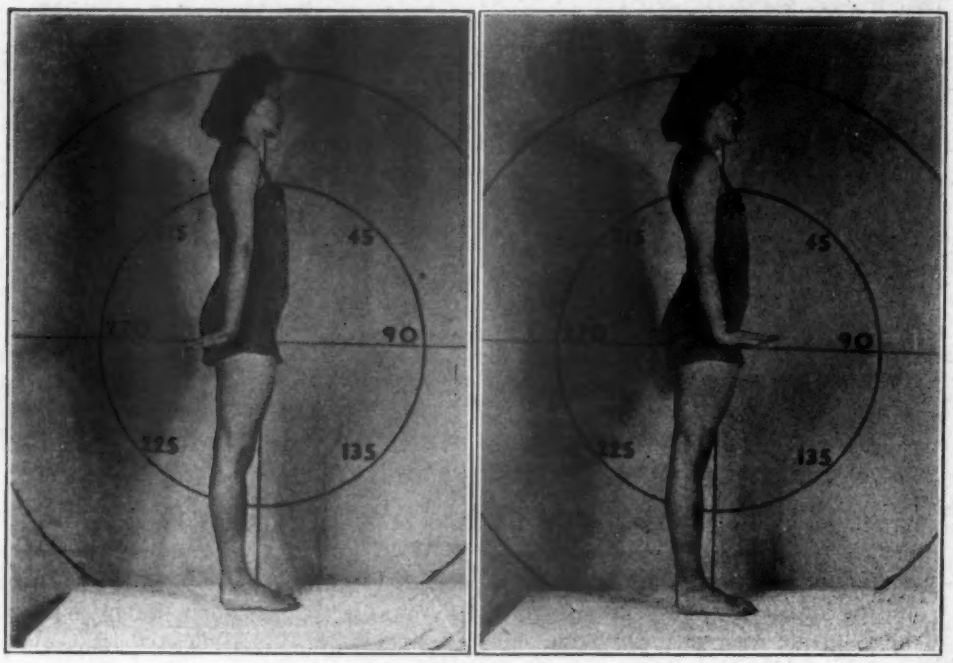
Abduction: This is the outward motion of the joint in the coronal plane away from the midsagittal plane. The protractor is centered on the shoulder joint; the stationary arm is placed parallel with the midline of the body posteriorly (vertebral column); the movable arm follows along the midline

3. Grant, J. C. Boileau: A Method of Anatomy, second edition, Baltimore, Williams and Wilkins, 1940.

of the humerus. The direct reading on the protractor would be the degree of abduction of the shoulder from the body.

Adduction: This is the inward motion of the joint in the coronal plane or the motion of returning from the limit of abduction to the anatomic position. The placement of the protractor is the same as for abduction. Unless this motion is limited, it is seldom recorded.

External Rotation: The starting or neutral position is as follows: Arm abducted to 90°, elbow flexed to 90°, forearm in pronation, palm facing the floor. The protractor is centered on the elbow joint; the stationary arm is placed along the ulnar border of the forearm; the movable arm is folded against the stationary arm until motion begins. As the shoulder is rotated backward the movable arm follows the forearm. In the normal shoulder, when the limit of external rotation is reached the forearm is practically upright and palm faces forward. The reading on the protractor is the deviation, or rotation, from the starting, or neutral, position.



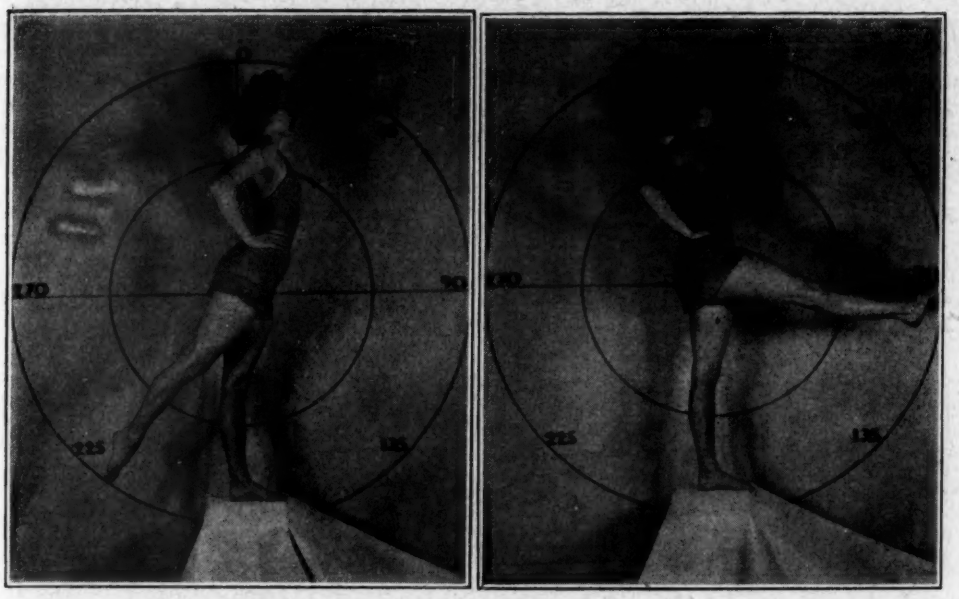
A. B.

Fig. 4. — *A*, right wrist in extension toward 360°. The anatomic position is not centered exactly on the circle. *B*, right wrist in flexion toward zero. See section on "Landmarks Defined" for measurement of motion.

Internal Rotation: The starting position is the same as for external rotation. As the shoulder rotates forward, the movable arm of the goniometer follows the forearm until the palm faces backward. The reading on the goniometer is again the deviation from the neutral position. Throughout both of these motions the stationary arm of the goniometer is held as though it were still parallel with the ulnar border of the forearm, as in the starting, or neutral, position.

Elbow Motion. — This can be measured with the subject standing, sitting or supine. The motions described are flexion, extension, pronation and supination.

Flexion: The protractor is centered on the elbow laterally; the stationary arm is placed along the midline of the humerus; the movable arm is



A. B.

Fig. 5. — *A*, right hip joint centered on circle in extension toward 360°. *B*, right hip flexion, straight leg raising.

extended along the midline of the forearm in supination (radial border). The angle of flexion is the direct reading on the protractor.

Extension: The anatomic landmarks are the same as for flexion. The movable arm follows the forearm as it extends, and the reading on the protractor at the limit of extension is the angle of extension unless the joint can extend beyond 180°. In that case the goniometer is turned around as in shoulder extension and the reading is subtracted from 360°.

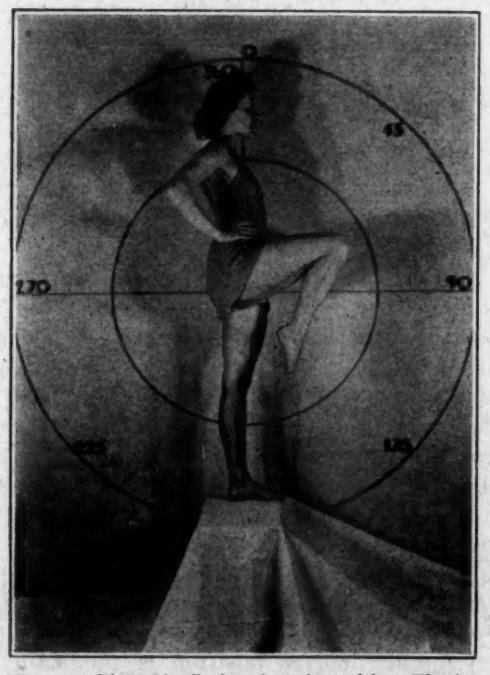
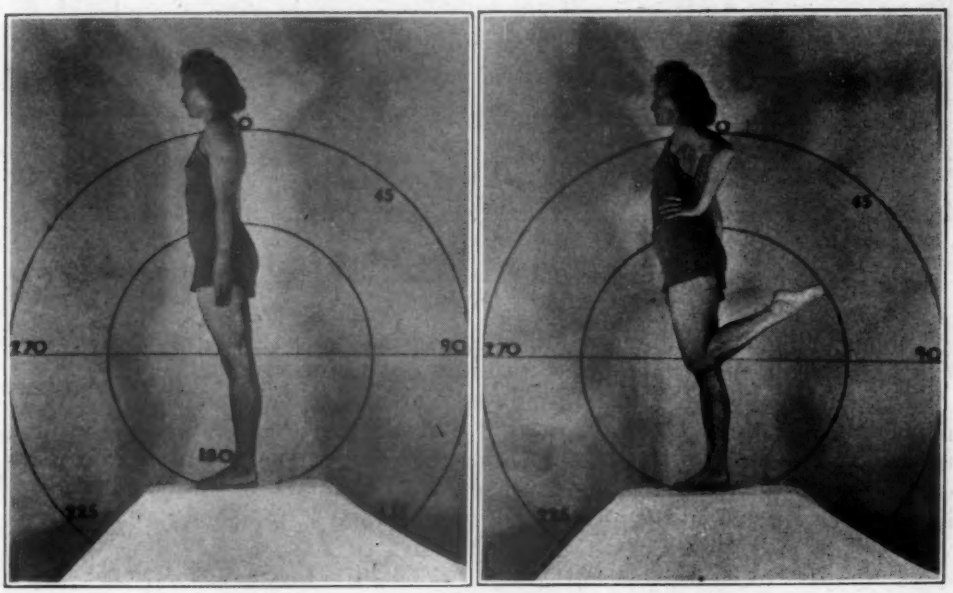


Fig. 6. — Right hip flexion, bent leg raising. The leg approaches closer to zero than in straight leg raising.

Pronation: The neutral position is as follows: elbow is flexed to 90° and held in complete adduction with the wrist straight, the radial side of the hand facing the ceiling and the palm facing the horizon. The protractor is held against the dorsal surface of the wrist; the stationary arm is placed parallel with the midline of the humerus; the movable arm follows the wrist as the forearm pronates and the palm is turned downward, facing the floor. The reading is direct.

Supination: The neutral position is the same as for pronation except that the protractor is held against the ventral side of the wrist. The movable arm follows the wrist as the forearm supinates and the palm is turned upward facing the ceiling.—The reading is direct.



A. B.

Fig. 7. — *A*, left knee centered on circle in full extension. Note that the subject is reversed on the circle, since all extension motions are backward except that of the knee. *B*, left knee flexion backward toward zero. All flexion motions are forward except that of the knee.

Wrist Motion. — This can be measured with the subject supine, sitting or standing. The motions described are flexion, extension and radial and ulnar deviation.

Flexion: The starting position is with the hand in pronation. The protractor is centered on the ulnar styloid process; the stationary arm is placed along the ulnar border; the movable arm is placed along the midlateral border of the fifth metacarpal bone and follows it as the palm of the hand moves toward the ventral surface of forearm. The reading is direct.

Extension: The starting, or neutral, position is the same as in flexion, with the goniometer turned around. The movable arm follows the midlateral border of the fifth metacarpal bone as the back of the hand moves toward the dorsal surface of the forearm. The reading is subtracted from 360°.

Radial Deviation: The protractor is centered over the midposterior carpal bone; the stationary arm is placed along the midline of the forearm; the movable arm is placed over the middle metacarpal bone and follows it as the hand deviates to the radial side. The reading is direct.

Ulnar Deviation: The neutral position is the same as for radial deviation. The goniometer is turned around and follows the middle meta-

carpal bone as the hand deviates to the ulnar side. The reading is direct.

Hip Motion. — The subject must be supine on a firm surface to stabilize the pelvis and vertebral column.

Flexion: The protractor is centered over the hip joint at the greater trochanter; the stationary arm is placed along the midaxillary line to the torso and the movable arm along the lateral midline of the femur. The reading is direct and can be made by straight leg raising (knee extended) and by bent leg raising (knee flexed). The latter gives the greater range.

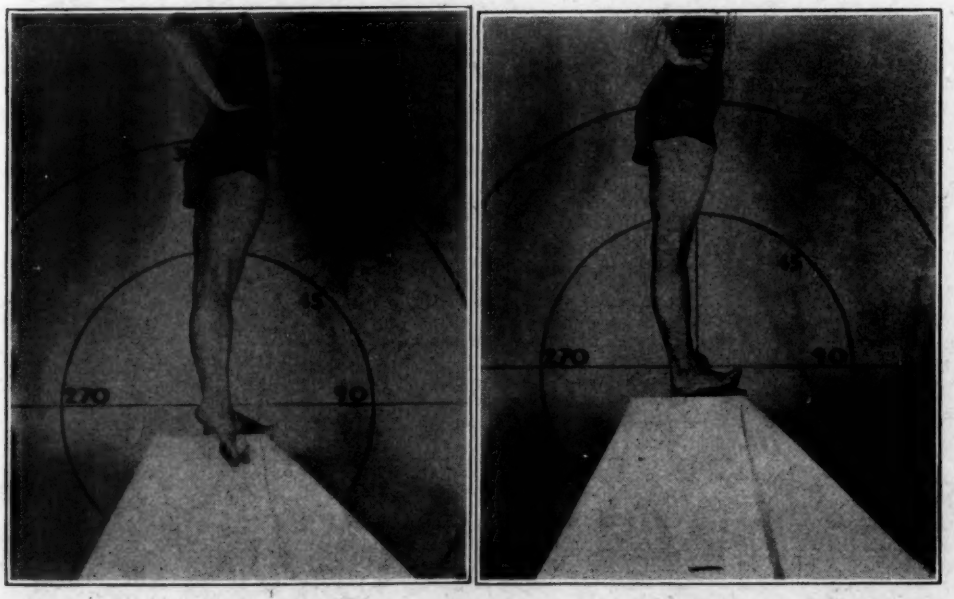
Extension: The subject must be prone to stabilize the torso. The same landmarks are used as for flexion. The goniometer is turned around, the movable arm follows the femur backward and the reading is subtracted from 360°.

Abduction: This can best be measured with the subject supine. As in the shoulder the motion is away from the midsagittal plane in the coronal plane. The protractor is not centered; the stationary arm is placed along the symphysis pubis (midsagittal plane); the movable arm follows along the anterior midline of the femur as the femur moves outward. The reading is direct.

Adduction: This is the motion that returns the femur from abduction to the anatomic position. The reading is seldom recorded.

External Rotation: The starting position is with the subject sitting and the knee flexed to 90°. The protractor is centered on the knee joint; the stationary arm is placed parallel to the ventral midline of the tibia; the movable arm follows the midline of the tibia as it swings medially. The reading is direct.

Internal Rotation: The starting position is the same as for external rotation. The movable arm follows the midline of the tibia as it swings laterally. The reading is direct. Throughout both of these motions the stationary arm remains parallel to the midline of the tibia, as if it were in its neutral, or starting, position.



A. B.

Fig. 8. — *A*, right ankle centered on circle in extension. Motion is toward 360° but seldom exceeds 180°. *B*, right ankle flexion toward zero. How to obtain maximum ankle flexion—before measuring, flex the knee joint—is not shown.

Knee Motion. — The subject may be prone or sitting on the edge of a chair so that the leg will not strike as it bends backward.

Flexion: The protractor is centered over the lateral aspect of the knee joint; the stationary arm is placed along the lateral midline of the femur (in line with the greater trochanter) and the movable arm along the midline of the tibia, with tip of the goniometer just anterior to the lateral malward.

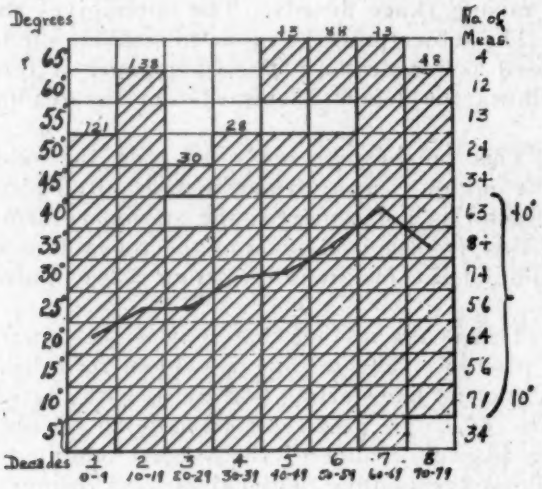


Fig. 9. — Distribution of shoulder flexion measurements by decades. The figures at the top of each column represent the number of measurements (and therefore the number of fractures) for each decade. The figures at the right show the number of measurements for each of the 5° units. The average flexion measurement for each decade is indicated by the heavy line superimposed over the cross-hatched blocks. (This explanation applies also to figures 10, 11, 12, 13 and 14).

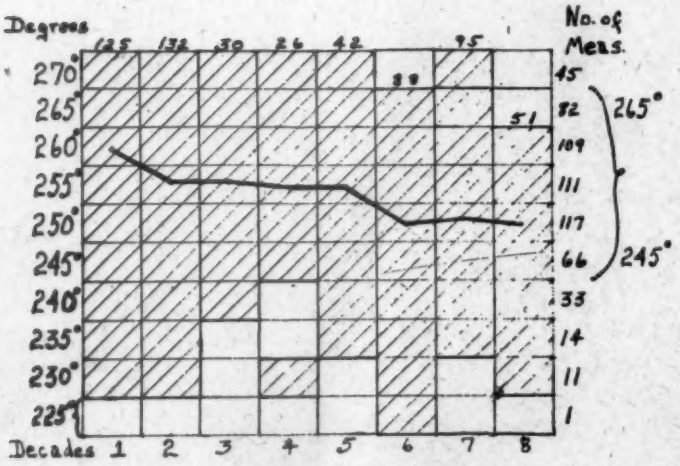


Fig. 10. — Shoulder extension.

Extension: The landmarks are the same as for flexion. The movable arm follows the tibia as it returns from flexion to full extension. This is the only extension motion that moves forward instead of backward. The reading is direct unless the extension is beyond 180°, in which case it is sub-

tracted from 360° (after one has turned the goniometer around to get the reading).

Ankle Motion. — This can be measured with the subject sitting or lying.

Flexion: The protractor is centered over the medial malleolus; the stationary arm is along the medial midline of the tibia and the movable arm along the medial midline or the first metatarsal bone, following this landmark as the dorsal surface of the foot approaches the anterior surface of the leg. The reading is direct.

Extension: The landmarks are the same as for flexion. The movable arm follows the first metatarsal bone as the foot moves downward and backward. The reading is direct.

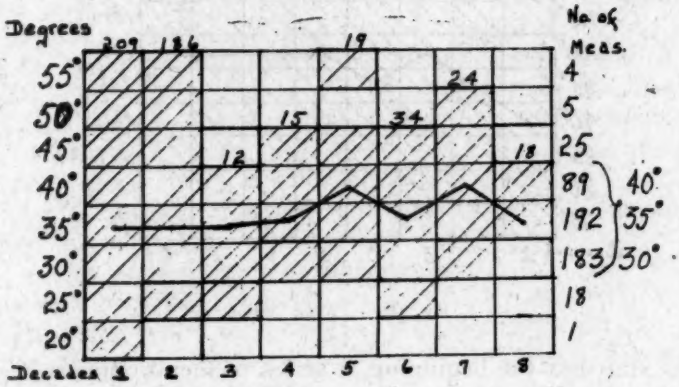


Fig. 11. — Elbow flexion.

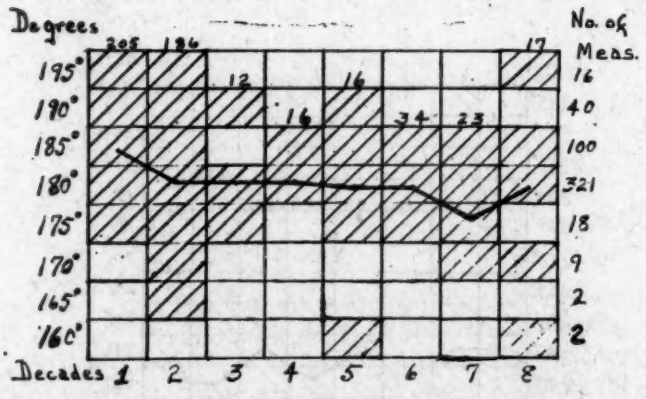


Fig. 12. — Elbow extension.

Eversion: This motion is subastragalar. The goniometer is set at 90°. The stationary arm is parallel to the medial malleolus; the movable arm is parallel to the anterior plantar surface of the heel as it shifts outward. The reading is direct.

Inversion: This motion is also subastragalar. The goniometer is set at 90°. The stationary arm is parallel to the lateral malleolus; the movable arm is parallel to the anterior plantar surface of the heel. The movable arm follows the plantar surface of the heel as it shifts inward. The reading is direct.

Normal Range of Joint Motion

The normal range of joint motion has variations due to several factors in flexibility:[4] (*a*) heredity or constitutional types, e. g. sthenic, hypersthenic and asthenic; (*b*) sex; (*c*) age; (*d*) practice or training; (*e*) occupational changes in posture, e. g. overdevelopment of the musculature; (*f*) anxiety, stress and tension states, and (*g*) confining illness.

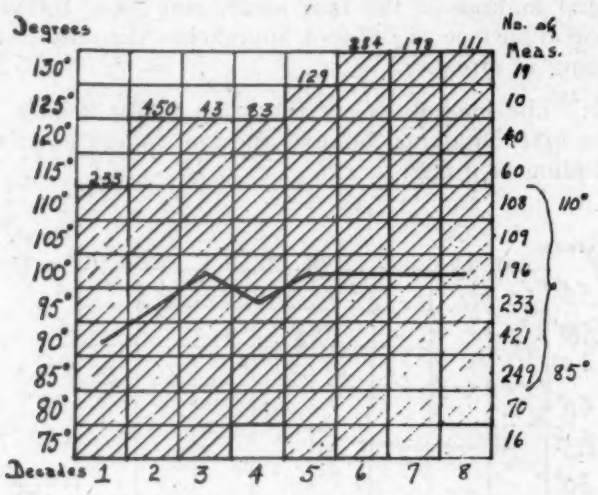


Fig. 13. — Wrist flexion.

As was stated at the beginning, a series of measurements were made on normal joints of patients in the fracture clinic of Minneapolis General Hospital. When a patient with a fracture of the clavicle or the radius was seen in the clinic, the fractured member was measured and at the same time the

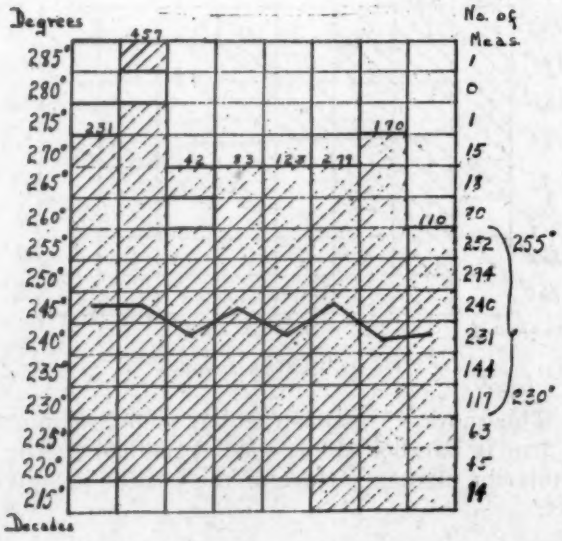


Fig. 14. — Wrist extension.

nonfractured member was measured and the result recorded. These meas-

4. Gurewitsch, A. D., and O'Neill, Margaret A.: Flexibility of Health Children, Arch. Phys. Therapy 25:216 (April) 1944.

urements will be considered here. Only the shoulder, elbow and wrist will be discussed.

Each block graph shows the distribution of measurements by decades. Age is the only one of the seven factors in flexibility previously mentioned which in this series is specifically shown. The range of measurements of shoulder flexion, shown in figure 9, varies from 5° to 50°. It can be seen that in this series there were more fractures about the shoulder girdle in the first, second, sixth and seventh decades than in the third, fourth, fifth and eighth decades. Most of the 589 measurements are in the bracket from 10° to 40°. The charted line, showing the average flexion measurements for each decade, rises to indicate a slight limitation of the normal range of flexion as age increases—the variation being from 20° to 40°.

Figure 10 is a similar block graph for shoulder extension measurements. The average extension for each age group is from 250° to 260° and shows very little limitation of this motion as age increases.

Elbow flexion is described in figure 11. Since 76 per cent of the 517 measurements were for persons in the first and second decades of life, the lack of variation with age as represented here is of little significance. This is also true of the elbow extension measurements as seen in figure 12. Note that elbow fractures occur mostly in the first two decades.

Wrist flexion, in figure 13, and wrist extension, in figure 14, each have over 1,500 measurements. The average flexion measurements increase slightly with age; i. e., the motion becomes more limited.

The average extension measurements vary less than 10° between the first and eighth decades. Note the few measurements for the second and third decades, showing how few fractures of the wrist occur in these age groups.

When the principle of the circle—flexion, the acute angle, approaching zero and extension, the obtuse angle, toward 360°—is kept in mind, the accompanying table shows the average range of motion for all decades in this series.

Average Range of Motion for All Decades

	Flexion	Extension
Shoulder	20°— 40°	250°—260°
Elbow	35°— 40°	175°—185°
Wrist	90°—100°	240°—245°

Summary

Standardization of the measurement of joint motion by using the principle of the circle is recommended. A measuring device that is simple, accurate and inexpensive is described. The skeletal landmarks for the application of this goniometer are defined, and the normal range of motion of the shoulder, elbow and wrist is discussed.

MEDICAL NEWS

Dr. Hibben Gives Health Week Talk

Dr. John Severy Hibben, past president of the American Congress of Physical Medicine, and President of the Pasadena-Alhambra Branch, Los Angeles County Medical Association, gave an outstanding talk recently in connection with Health Week observed in Los Angeles. Dr. Hibben in his talk outlined some of the new developments in medicine and reviewed the aims of ethical physicians, nurses and dentists as set forth by the Public Health League of California.

Dr. Ralph Pemberton Made President

Dr. Ralph Pemberton, Professor of Medicine in the Medico-Chirurgical College Graduate School of Medicine, University of Pennsylvania, has been elected president of the Pan American League for the Study and Control of Rheumatic Diseases.

Walter Eugene Garrey Honored

On April 6 a portrait of Dr. Walter Eugene Garrey, Professor Emeritus of Physiology, Vanderbilt University School of Medicine, Nashville, was presented to him by friends, students and associates. Dr. Frank H. Luten, Professor of Psychiatry at the medical school, presented the portrait. The principal speaker was Howard J. Curtis, Ph.D., Assistant Professor of Physiology, Columbia University College of Physicians and Surgeons, New York, who discussed "Excitation and Conduction in Nerve." Dr. Garrey had been a member of the faculty since 1925. He is a member of the Council on Physical Medicine of the American Medical Association.

Occupational Therapy at the University of Southern California

In the occupational therapy division under assignment by the war department 127 women students are now in training at the University of Southern California. Art classes are geared to the needs of the profession of occupational therapy and are training their students to perform treatments for mental, joint and muscle injuries.

Dr. Wayne McFarland is director of the course which is a part of the Department of Physical Medicine, School of Medicine, University of Southern California.

Dr. Gamble to Ohio State University

Dr. S. G. Gamble until recently associated in the department of physical medicine at the Cleveland Clinic has accepted the appointment of Assistant Professor in the Department of Medicine with special teaching and hospital duties in the field of physical medicine at Ohio State University.

Lenox Baker Elected President

Dr. Lenox D. Baker, a member of the Congress has been elected president of the North Carolina League for Crippled Children. Dr. Baker is associate professor in charge of orthopaedics at Duke University School of Medicine. He is orthopaedic consultant for the Crippled Children's Division of the State Board of Health, and also for the Vocational Rehabilitation Department of the State of North Carolina. He is secretary for the section on orthopaedics and traumatic surgery of the Southern Medical Association. Dr. Baker is a diplomate of the American Board of Orthopaedic Surgery, and a member of the American Academy of Orthopaedic Surgery.

Graduation at Cleveland Clinic

Certificates were awarded to the students of the course in physical therapy of the Cleveland Clinic Foundation, June 15, 1945.

The address of welcome was given by Dr. A. D. Ruedemann of the clinic staff and the address to the graduates was given by Dr. Don W. Gudakunst, medical director of the National Foundation for Infantile Paralysis. Dr. Walter J. Zeiter is medical director of the course.

Comdr. Miller Appointed Medical Director

Comdr. James Roscoe Miller (MC), dean of Northwestern University Medical School, currently in charge of the section on internal medicine, professional division of the Bureau of Medicine and Surgery, Washington, D. C., has been appointed medical director of the Chicago and Northwestern Railway system, effective on his release from service and in addition to his activities as dean.

Changes in Course for Physical Therapists at Northwestern University Medical School

Beginning with the October 1st, 1945 class the course for Physical Therapists at Northwestern University Medical School will be (1) extended over a period of four quarters (12 months); (2) the tuition will be increased to $300.00, the student health fee to $16.00, and (3) the minimum entrance requirements for others than graduates of an approved School of Nursing or Physical Education will be returned to ninety (90) semester hours of college credit, including twenty-six (26) semester hours of physics, chemistry and zoology, as was required at Northwestern University Medical School previous to 1943.

(Continued on page 429)

ARCHIVES of PHYSICAL MEDICINE
OFFICIAL PUBLICATION AMERICAN CONGRESS OF PHYSICAL MEDICINE

.·. EDITORIALS .·.

CANCELLATION OF 1945 SESSION

By action of the Board of Governors of the American Congress of Physical Medicine the Convention for September, 1945 has been cancelled. This is in keeping with the request of Mr. Byrnes to eliminate gatherings during the war emergency and particularly at this time when the carrier space is needed to facilitate the transporation of our men in uniform.

It is hoped that by the time our next meeting is due that this crises will have passed and that we can again resume normal activities.

PHYSICAL MEDICINE AND THE GOVERNMENT

The American Congress of Physical Medicine has been in the foreground since 1938 in the discussion of the governmental regulations effecting physical medicine. This has involved two problems: Diathermy and radio interference and the War Production Board, Limitation Order L-259. Dr. Frank H. Krusen then President of the American Congress of Physical Therapy on September 24, appointed a committee on radio interference. In the October, 1939 issue of the ARCHIVES OF PHYSICAL THERAPY this committee reported that on January 9, at the Harkness Theatre, Columbia University, a meeting was held with the representatives of the Federal Communications Commission, the American Congress of Physical Therapy being represented by Drs. Frank H. Krusen, Richard Kovács, William Bierman, Norman Titus and K. G. Hansson.

At this meeting Dr. Krusen stated that he felt he voiced the opinion of all the physicians with whom he had talked when he stated that it was their desire to cooperate to the utmost in any plan for preventing radio interference. Attention was called to the fact that high frequency electrical currents were used in medicine long before they were used for communications. It was shown that the proper employment of medical diathermy might reduce the period of convalescence in certain diseases and injuries, thus lessening the cost of medical care and returning the patient to his occupation in shorter time.

Dr. Frank E. Adair, Executive Officer of the Memorial Hospital, American Society for the Control of Cancer and Chairman of the Committee on the Treatment of Malignant Diseases of the American College of Surgeons, Dr. George Hoyer, Head of the Department of Surgery at the New York Hospital, Dr. W. P. Merrill of the American Hospital Association, Dr. Anthony Cipollaro of Columbia University and Dr. A. U. Desjardins of the Mayo clinic all spoke on the value of medical and surgical diathermy.

With the cooperation of the Editor, Dr. Disraeli Kobak, there was published in the ARCHIVES OF PHYSICAL THERAPY in May, 1939, a comprehensive report entitled, "The Medical Viewpoint of Interference to Radio Reception by Electro-Medical Equipment."

On February 15, 1943 an order was issued by the War Production Board (Limitation Order L-259) which by depriving physicians of the necessary physical therapy apparatus seriously curtailed the rehabilitation of industrial

workers whose continuous attendance at work and unimpaired efficiency are as essential to the successful conclusion of this war as are the activities of combatant units. The ARCHIVES OF PHYSICAL THERAPY in March, 1943 published this order and urged the members of the American Congress of Physical Therapy to protest this order.

In March, 1944, the ARCHIVES published a news announcement as follows:

> Dr. Coulter made several trips to Washington and elsewhere, exerted great effort and had great influence in convincing the War Production Board and its advisors that Order L-259 could wisely be liberalized. Unfortunately, in the midst of these efforts on the part of Dr. Coulter, he became ill and for many months was forced on this account to forego all of his many activities, including this one. Dr. Coulter asked Dr. Frank H. Krusen, a member of the Council on Physical Therapy, to carry on the endeavor in behalf of the physicians using physical therapy equipment and the manufacturers serving them. Dr. Krusen has made several trips to Washington and has done an outstanding job in the capacity of advisor to the War Production Board. He has had much to do with the entire matter and particularly the final drafting of a very liberal proposed order.
>
> It appears that due to the good work of Dr. Coulter and Dr. Krusen, Order L-259 will be revised in the early future and will be liberalized to the extent that we can resume the manufacture and sale of physical therapy equipment on a basis adequately liberal for present day needs.

In April, 1944 the ARCHIVES reported that Order L-259 was amended by the War Production Board and the announcement further stated that "Medical practitioners and hospitals may now buy certain types of equipment that formerly were manufactured only for the armed services and lend-lease, and medical practitioners may also buy other types formerly restricted to these groups and to hospitals."

Many conferences have also been held to discuss the problem of radio interference by short wave diathermy machines. Mr. Howard Carter, an associate member of the Congress and Secretary of the Council on Physical Medicine of the American Medical Association was chairman of Panel 12, Medical and Surgical Section of the Radio Technical Planning Board. An oral argument and further hearing was held March 2 and 3 in Washington, D. C., by the Federal Communications Commission. Dr. William H. Schmidt, chairman of the joint committee of the American Congress of Physical Medicine and the Society of Physical Medicine to discuss this problem, attended the hearing and stated: "High frequency currents now occupy an important place in the practice of medicine. Increasing thousands are being treated every day, especially with the new uses in the government hospitals. Anything that will deny to the patient the valuable benefits of the high frequency current or that will make the cost of treatment greater demands serious consideration."

Dr. E. J. C. Hildenbrand, a member of the Congress was asked to represent the Council on Physical Medicine of the American Medical Association. He spoke on the value of short wave diathermy to the medical profession.

The ARCHIVES OF PHYSICAL MEDICINE in June, 1945, carried an editorial announcing the final frequency allocations as assigned by the Federal Communications. With one change this final allocation is the same as that originally proposed by the Commission in its report of January 15, 1945. The change consists of an expansion of the 27 megacycle band from an originally proposed width of plus or minus .05 per cent of the center frequency to a width of plus or minus .5 per cent of that frequency. Existing equipment

will, in general, be permitted to operate as before for a reasonable period of time to be designated later.

NEW DIRECTORY OF REGISTERED PHYSICAL THERAPISTS

The American Registry of Physical Therapy Technicians has performed in excellent fashion the important service of examining during wartime increasingly greater numbers of graduating physical therapists. The high standards of the profession are in this way being maintained. It is for the best interest of Physical Medicine that physicians make full use of the new directory of registered technicians appearing in this issue of the ARCHIVES, when employing or recommending physical therapists. Attention is also drawn to the fact that the American College of Surgeons sets as a standard of approval for hospital physical therapy departments the employment of physical therapists registered by the A.R.P.T.T.

Medical News

(*Continued from page 426*)

Physical Therapy Conference

On May 4, 1945, the Commanding General, Army Service Forces, approved a request for a Technical Training Conference for Directors of Physical Therapy and Physical Therapists from General Hospitals conducting Physical Therapy Training Courses and from selected Amputation Centers. The request was initiated in the Office of Colonel Leonard T. Peterson, Orthopedic Consultant, Office of The Surgeon General and concurred in by the Training Division, Office of The Surgeon General. This conference was conducted at Percy Jones Hospital Center, Battle Creek, Michigan, and Gardiner General Hospital, Chicago, Illinois, from May 16th to 18th, under the direction of Colonel Peterson, assisted by Major Emma E. Vogel, Director of Physical Therapists, and Captain Mary Lawrence, Physical Therapist, both from the Office of The Surgeon General.

The following delegates attended the conference:

Ashford General Hospital, White Sulphur Springs, W. Va., Capt. Carl Levenson, M.C.; Capt. Agnes Snyder, M.D.P.T.

Lawson General Hospital, Atlanta, Ga., Capt. Arthur Pruce, M.C.; 1st Lt. Constance Hagan, M.D.P.T.

Brooke General Hospital, Fort Sam Houston, Texas, Capt. Joshua Ehrlich, M.C.; Capt. Elsie Kuraner, M.D.P.T.

Fitzsimons General Hospital, Denver, Colo., Major Ora Huddleston, M.C.; 1st Lt. Mary Menzel, M.D.P.T.

O'Reilly General Hospital, Springfield, Mo., Capt. William McAuliffe, M.C.; Capt. Ethel M. Theilmann, M.D.P.T.

Army Medical Center, Major Donald Rose, M.C.; 1st Lt. Emma Harr, M.D.P.T., and 2nd Lt. Paige L. Weaver, M.D.P.T.

Bushnell General Hospital, Brigham City, Utah, 2nd Lt. Maude Welling, M.D.P.T.

McCloskey General Hospital, Temple, Texas, Capt. James Scales, M.C.; Capt. Atha Scott, M.D.P.T.

McGuire General Hospital, Richmond, Va., Capt. Thomas Dring, M.C.; 1st Lt. Elizaebth Emory, M.D.P.T.

England General Hospital, Atlantic City, N. J., Capt. Ester Anderson, M.D.P.T.

Kennedy General Hospital, Memphis, Tenn., 1st Lt. Ann Taylor, M.D.P.T.

Valley Forge General Hospital, Phoenixville, Pa., 1st Lt. Mary L. Ben Dure, M.D.P.T.

Hoff General Hospital, Santa Barbara, Calif., Capt. Louise Christman, M.D.P.T.

Regional Hospital, Fort Bragg, Fort Bragg, N. C., Capt. Margaret Whitehurst, M.D.P.T.

Lovell General Hospital, Fort Devens, Mass., Capt. Virginia M. Greenwood, M.D.P.T.

Percy Jones Hospital Center, Battle Creek, Mich., Capt. Robert Dow, M.C.; Capt. Margaret Rhodes, M.D.P.T.

Surgeon General's Office, Colonel Leonard T. Peterson, M.C.; Major Emma E. Vogel, M.D.P.T.; Capt. Mary Lawrence, M.D.P.T.

The program included discussion of the following subjects: The Physical Therapy and Occupational Therapy Program for Amputees; Iontophoresis; Chest Conditions with Special Reference to Breathing and Other Exercises; Peripheral Nerve Injuries and Electrodiagnostic Tests; Physical Therapy Problems in Overseas Installations; Problems Pertaining to Physical Therapy Training Programs and the High Resistance Low Repetition Exercise Program.

This conference was the first one of this nature to be conducted by the Medical Department of

the Army. In view of the rapid expansion which has recently been accomplished in the Physical Therapy Training Program, it is felt that the opportunities provided by these meetings will prove to be timely and valuable.

Importance of Physical Medicine

The presidents of three of the outstanding medical groups in the nation joined with Dr. Thomas Parran, Surgeon General of the United States Public Health Service, in pointing to the importance of physical therapy in the postwar medical world, and urged young women and men to avail themselves of free training for careers as physical therapists.

Dr. Herman L. Kretschmer, president of the American Medical Association, declared that the need for physical therapists was "most urgent and will increase rather than decrease as time goes on." The increasing demand for trained physical therapists in hospitals, in industrial medicine, as aides to general practitioners and in the rehabilitation of the war wounded and of infantile paralysis patients was outlined in statements by Dr. Donald C. Smelzer, president of the American Hospital Association; Dr. Frederick W. Slobe, president of the American Association of Industrial Physicians and Surgeons, and Dr. Parran.

Dr. Parran declared that there are already "millions of Americans who need the help of physical therapists "as a result of crippling diseases, accidents and war wounds. As the number of older persons in our population increases, Dr. Parran asserted, "other thousands will need physical therapy for the many disabling diseases which afflict old age."

Dr. Kretchmer said: "Possibly no profession associated with the medical world offers more opportunities as a career than does that of physical therapy. Not only will young people taking up this profession provide themselves with a career that has a great future, but they also will be making a distinct contribution to the achievement of the health and welfare of the American people."

According to Dr. Smelzer, the cost of proper training for a physical therapist up to now has been a factor in the inadequate number of qualified men and women in the field. Dr. Smelzer said he believed the scholarships offered by the National Foundation provided "the proper incentive which will result in a wide expansion of the physical therapy facilities available, not only for sufferers from that dread disease, infantile paralysis, but also for a substantial group of other patients who can benefit from skilled physical therapy."

Stressing the growing recognition by industry of the value of physical therapy, Dr. Slobe said: "During the manpower shortage created by the war it has been amply demonstrated that the record of the handicapped absorbed by industry has been such that their production, safety record, and absentee record have been better than average. This is ample proof of the value of rehabilitation and selective job placement."

The free training courses are of nine and twelve months duration. Scholarships cover transportation and living costs, in addition to tuition. Applicants must have a minimum of two years of college, including at least 12 semester units of biology and other basic sciences, or be graduates of schools of nursing or physical education. Inquiries may be made to the National Foundation for Infantile Paralysis, 120 Broadway, New York 5, N. Y.

General Lull Discusses Psychoneurotics

Speaking on the "Doctors Look Ahead" radio program recently, Major General George F. Lull, U. S. A., Deputy Surgeon General, stated that out of every hundred soldiers suffering from combat-engendered emotional disturbances, 40 to 50 are fit for return to combat after two days under the care of their divisional psychiatrist. An additional 10 to 15 men return to combat after two weeks of treatment in forward hospitals. About 30 more of the hundred improve sufficiently to remain in the theater in some non-combat job, while others can continue to do some type of Army work in this country.

The remainder who are discharged from the Army suffering from some type of psychoneurosis are not insane, General Lull stated emphatically. "Treat them with naturalness, understanding and patience," he advised. "Help them get established in their home, among their friends and in a good job—and the chances are 10 to 1 that their combat nervous symptoms will fade entirely."

General Lull Attends Physical Fitness Conference

Major General George F. Lull, U. S. A., Deputy Surgeon General, attended the recent meeting in Chicago of the Joint Committee on Physical Fitness as a member of the Executive Committee. The meeting was devoted to a conference on standards of physical fitness.

The Joint Committee, which represents the American Medical Association and the National Committee on Physical Fitness of the Federal Security Agency, was formed as a result of the "appalling need" for increased physical fitness of civilians which was revealed by Selective Service rejections and health statistics. Colonel Leonard G. Rowntree, M.C., Chief of the Medical Department of Selective Service, is Chairman of the Committee. The movement is enlisting the support of schools and colleges, industry, medical and national organizations.

The National Society for Crippled Children and Adults

During the almost twenty-five years of its existence as a national society for crippled children the Society by that name has carried on an expanding program for crippled children under a devoted leadership. Although the Society has

worked consistently in the interests of the crippled child, it has found itself increasingly in recent years spilling over into the youth and adult field. Therefore it seemed a natural step that The National Society for Crippled Children should change its name to The National Society for Crippled Children and Adults.

Charles Stephenson Succeeds Clarence Little

Rear Admiral Charles S. Stephenson (MC), U. S. Navy, retired, has been appointed acting managing director of the American Cancer Society. He will succeed Clarence C. Little, Sc.D., Bar Harbor, Maine, who will direct studies of genetic factors of intelligence and emotional variations in mammals under a Rockefeller Foundation grant. Admiral Stepehnson was named some months ago as secretary of the research division of the cancer society. Dr. Little will continue as a member of the society's board of directors.

Cleveland Hearing and Speech Center

The Cleveland Hearing Center and Speech Clinic at Western Reserve University have formed the Cleveland Hearing and Speech Center, Inc., and will establish quarters at 11206 Euclid Avenue on the university campus in the fall or as soon as the release of material and labor for remodeling permit.

Surgeon General Outlines Personnel Release Policy

Substantial releases of Army Medical Department personnel will not take place before the latter part of this year, Surgeon General Norman T. Kirk said in announcing a policy on discharges in conformity with War Department procedures. This is due to the fact that the peak of the Medical Department's activities will not be reached until fall.

It reads:

Medical Corps

a. Officers whose services are essential to military necessity will not be separated from the service.

b. Officers above 50 years of age whose specialist qualifications are not needed within the Army will receive a high preferential priority for release from active duty.

c. Adjusted service ratings will be utilized as a definite guide to determining those who are to be separated.

Insurance: Chiropractic Treatments as "Medical or Surgical Treatments or Attention"

The defendant insurance company issued a policy of insurance Feb. 2, 1942 on the life of Pauline Kahn in which Herman Kahn was named as beneficiary. The policy provided that if within two years prior to the date of issue of this Policy the Insured has received institutional, hospital, medical or surgical treatment or attention, and the insured or any claimant under the Policy fails to show that the condition occasioning such treatment or attention was not of a serious nature or was not material to the risk, this Policy shall be voidable by the Company . . . unless reference to such institution, hospital, medical or surgical treatment or attention is endorsed on this Policy by the Company. . . .

From January, 1940 to January, 1942 the insured submitted to more than one hundred treatments from a chiropractor for "shortness of breath, obesity, tiredness, menopause and various minor ailments such as colds and things of that sort." Admittedly, the chiropractic treatments were administered to the insured "for a serious condition or ailment." The insured died Jan. 12, 1943 and the insurance company refused to pay under the policy, contending that "within two years prior to the date of issue of the policy the insured received medical treatment or attention, and reference to such medical treatment or attention is not endorsed on the policy and the defendant (the insurance company) has declared the policy void." The beneficiary brought suit on the policy. At the close of the evidence the trial court instructed the jury that "there is no proof of any medical treatment of this woman at any time." From a verdict and judgment for the beneficiary the insurance company appealed to the supreme court of New Jersey.

The question here for determination, said the supreme court, is whether or not treatments or adjustments by a chiropractor are "medical or surgical treatment or attention" as used in the policy of life insurance involved. The word "medical" means "of, pertaining to, or dealing with, the healing art, or the science of medicine; especially in the narrower sense; as, medical profession; medical services; medical jurisprudence." The word "medicine" is defined as "the science and art dealing with the prevention, cure or alleviation of disease; in a narrower sense, that part of the science and art of restoring and preserving health which is the province of the physician as distinguished from the surgeon and obstetrician." Webster's New International Dictionary. In administering the chiropractic adjustments to the insured, continued the court, the chiropractor held himself out as attempting to prevent, cure or alleviate the conditions from which his patient suffered. The legislative history in connection with the practice of chiropractic is illuminating. By chapter 4, Laws, 1920, the New Jersey legislature enacted a statute entitled "An Act to regulate the practice of chiropractic." The following year that act was repealed and the legislature enacted a supplement to "An act to regulate the practice of medicine and surgery, to license physicians and surgeons, and to punish persons violating the provisions thereof." Laws, 1921, chapter 136. Through the revision of 1937 and as recently as Laws, 1939, chapter 115, the subject of chiropractic has been dealt with by the legislature under the general heading of "An act to regulate the practice of medicine and surgery." The effect of chapter

136, Laws, 1921, and the subsequent acts amendatory and supplemental thereof was to grant to chiropractors a limited license to practice medicine. In *State Board of Medical Examiners* v. *Maza*, 153 A. 259, 9 N. J. Misc. 171, the supreme court said:

The precise question therefore is whether chiropractic is a branch of medicine or surgery. Evidently the Legislature elected so to regard it, when after passing the "Act to regulate the practice of chiropractic," chapter 4 of the Laws of 1920, it repealed it the following year by chapter 136 of the Laws of 1921 (P. L., at p. 268), and provided for "limited licenses" under the Medicine and Surgery Act. . . . We consider that it was entirely within the power of the legislature to label chiropractic as a branch of medicine or surgery.

There have been a number of cases, continued the supreme court, of which *State Board of Medical Examiners* v. *Maza, supra; Heintze* v. *New Jersey, etc., Medical Examiner*, 107 N. J. L. 420, 153 A. 253, affirmed 110 N. J. L. 24, 163 A. 892; *Miller* v. *State Board of Medical Examiners*, 167 A. 740, 11 N. J. Misc. 653, are typical, which deal with the convictions of chiropractors for engaging in the practice of medicine. A close scrutiny of these cases will in each instance disclose that the convictions are based on the performance of acts by the chiropractors which went beyond the scope of the limited license that was issued to them, or with the practice of chiropractic by unlicensed persons. We find nothing in that line of cases incompatible with the holding that a chiropractor practicing within the limits of his license is engaged in the practice of medicine. We believe that the trial court took too narrow a view of the word "medical" as used in the policy under consideration. Considering the legislative action referred to, it seems indisputable that the adjective "medical" is used in the broad generic sense comprehended by the definition given and is inclusive of the practice of chiropractic. The undisputed evidence disclosing the treatments within the two year period and reference to such treatments not having been endorsed on the policy as required, or disclosed in the application, it was the duty of the trial court to direct a verdict in favor of the insurance company.

The judgment in favor of the beneficiary was reversed and judgment was entered in favor of the insurance company.—*Kahn* v. *Metropolitan Life Ins. Co., 41 A. (2d) 329 (N. J., 1945)*. — J. A. M. A. **127**:1075 (Apr. 21) 1945.

Physical Therapy Need—Army and Navy Recommend Scholarships to Youths

Maj. Gen. Norman T. Kirk, Surgeon General of the Army, and Vice Admiral Ross T. McIntire, Surgeon General of the Navy, yesterday urged young men and women throughout the country to avail themselves of the scholarships offered by the National Foundation of Infantile Paralysis, which has appropriated $1,267,600 for a physical therapy program.

Both emphasized that the return of the wounded from many fronts has intensified the shortage of physical therapists. Applications for scholarships are being accepted by the National Foundation's office, 120 Broaway.

Curvative Workshop Milwaukee Celebrates Twenty-Five Years of Service

The Curative Workshop of Milwaukee on Sunday, May 13, 1945, celebrated twenty-five years of progress in serving the physically handicapped in that community. The executive director, Miss Marjorie Taylor is well known to many of our readers.

1945 Lasker Award Designated for Rehabilitation of Mentally Handicapped

The Lasker Award for 1945 will be given for a noteworthy contribution to the rehabilitation of the mentally handicapped. The National Committee for Mental Hygiene, which made the announcement April 1, is now receiving nominations with supporting data, to be presented to an anonymous jury selected each year for its competence to judge accomplishment in the field chosen. The award of $1,000, established in 1944, is made annually in November by the Mary and Albert Lasker Foundation for meritorious service and significant contributions to promoting mental health and increasing public understanding of mental hygiene. Col. William C. Menninger, M.C., chief consultant in neuropsychiatry, Office of the Surgeon General of the U. S. Army, was the first recipient of the award, for his contribution to the mental health of men and women of our armed forces.

Fifty Year Anniversary St. Francis Health Resort

On May 22nd the well known convalescent resort of St. Francis celebrated 50 years of its useful existence. Situated in the rolling hills of northern New Jersey, one hour's distance from New York, it was founded by a Bavarian priest, Father Joch, to make available the Kneipp method of hydrotherapy. Through half a century of untiring labors of nuns of the order of the Sisters of the Sorrowful Mother, the St. Francis Resort has become the best equipped and largest convalescent institution in the East. Under the direction of a resident physician it operates two complete hydrotherapy departments for men and women, with some additional physical therapy equipment, and possesses sun decks, roof garden, solarium, landscaped terraces. Its own fresh dairy and farm products serve for healthy and abundant dietary. The institution now can accommodate 300 convalescents at a time and with its Sisters trained in nursing, physical therapy and laboratory procedures, aided by other technicians, renders a most welcome service to the many thousands who come there yearly in their quest of health, when convalescing or simply tired.

Congress Favors Bill to Create Veterans Medical Department

Both sides of the House are favorably disposed toward the proposed Veterans Administration reorganization which would establish a bureau of medicine and surgery within the agency, having independent status similar to the Army and Navy Medical Corps. In fact, both Republicans and Democrats claim credit for the idea. Democratic Representative Rankin, who introduced a bill which Representative Rogers, Republican of Massachusetts, said she "had been working on for months," said the measure would give the Veterans Administration power to replace "undesirable" members of its present medical and nursing staffs.

Representative Rankin, Mississippi, introduced a bill to establish a Department or Bureau of Medicine and Surgery in the Veterans Administration, H. R. 3310. Representative Rogers, Massachusetts, introduced a similar bill, H. R. 3317, and a companion bill was introduced in the Senate by Senator Johnson, Colorado, S. 1079.

In addition to proposing a reorganization of the medical facilities of the Veterans Administration, these bills provide that any personnel needs of the several corps to be created in the Veterans Administration, including a Medical Corps, may be filled by assignment of selected or drafted persons and that commissioned, appointed or enlisted medical personnel of the Army or Navy may be detailed for service with the Veterans Administration.

Physically Handicapped Persons

The House Committee on the Judiciary has reported H. J. Res. 23 with amendments, designating the first week in October of each year as National Employ the Physically Handicapped Week.

Physicians Needed for Navy

The Navy needs 4,000 additional reserve officers in its Medical Corps, and physicians who are interested should get in touch either with the Naval Officer Procurement Branch in Washington or with their local procurement and assignment service.

Pamphlet Available

The Physical Therapy Branch of the Medical Department of the Army announces that T. B. Med. No. 122 entitled, "Physical Therapy for Amputees," is now available for purchase from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

Increase in Cases of Poliomyelitis

On the eve of infantile paralysis summer outbreaks, a recapitulation of the figures available, shows that the number of poliomyelitis cases in the country is running about fifty per cent ahead of a year ago. As of mid-May, the number of new cases this year were 642 as compared with 424 cases for the same period in 1944.

Sharp increases have been reported in the New England states, Middle Atlantic states, South Atlantic area, and the East South Central states. In the Pacific Coast and West South Central areas which have been hard hit during the past two years, there has been a noticeable drop in the number of new cases. The remainder of the country is running about the same as last year.

As a further aid in the fight against infantile paralysis, the National Foundation is distributing hundreds of thousands of bulletins entitled, "When Polio Strikes" which includes many helpful hints for parents. It also contains a series of simple precautions to be taken by parents during the summer months.

University News

The Commonwealth Fund has appropriated $8,200 to be used by Dr. Carl J. Wiggers and associates of the department of physiology, Western Reserve University School of Medicine, Cleveland, to continue their studies on the peripheral circulation and shock during 1945-1946.

College of Radiology Moves

The American College of Radiology has moved its headquarters from 540 North Michigan Avenue to 20 North Wacker Drive, Chicago 6.

Medical Department Physical Therapists

Medical Department Physical Therapists whose husbands have been released from active duty will be discharged on request when release of husband is proven. Military necessity will govern all others. Since there is a shortage of these officers, it is not contemplated that others will be released from the service except as just mentioned.

A Subcommittee on Industrial Medicine

A Committee on Medicine and the Changing Order of the New York Academy of Medicine has created a subcommittee on industrial medicine consisting of Drs. Anthony J. Lanza and Thomas D. Dublin. The purpose of the committee is to advance certain recommendations as to the developments that are indicated in the immediate future in the field of industrial health.

New York Rheumatism Association

The annual meeting of the New York Rheumatism Association was held May 9 at the New York Academy of Medicine. The program was as follows:

Dietary Deficiency in the Etiology of Interstitial Calcinosis (Calcium Gout). John Lansbury, Temple University, Philadelphia.

Observations on Juvenile Rheumatoid Arthritis (Still's Disease). James Coss, Presbyterian Hospital, New York.

Polymyositis in Rheumatoid Arthritis. Hugo Freund, and Gabriel Steiner, Detroit.

Bone Marrow Findings in Arthritis. Eugene F. Traut, Chicago.

The Rheumatic Centers of the United States Army. Philip S. Hench, Lt. Colonel, M.C., A.U.S., and Edward W. Boland, Major, M.C., A.U.S., Army and Navy General Hospital, Hot Springs, Arkansas.

Acute Arthritis Resembling Reiter's Syndrome. Joseph L. Hollander, Captain, M.C., A.U.S.; Charles W. Fogarty, Jr., 1st Lieutenant, M.C., A.U.S.; David M. Kydd, Major, M.C., A.U.S., and Nathan R. Abrams, Captain, M.C., A.U.S., Ashburn General Hospital, McKinney, Texas.

Transmission of Gold Salts to the Fetus Through the Placenta. A. S. Gordon, Brooklyn, New York.

The British Council for Rehabilitation

Rehabilitation of the disabled is receiving great attention at present. The advances in orthopedics and modern methods of training have greatly increased the economic potentialities of the permanently disabled. The government has given valuable support to rehabilitation by its recent Disabled Persons Employment Act. A British Council for Rehabilitation has just been formed. Its object will be to bring together workers in every field of rehabilitation so that all may learn the problems involved and approach them along coordinated lines, to become a source of information and guidance on matters relating to the rehabilitation services, to organize short term courses of study of the various aspects of rehabilitation and to promote research into problems which concern the economic outlook of the permanently disabled. The council hopes to work in close collaboration with government departments. The Ministries of Health, Supply, Labor, Pensions and Fuel and Power have accepted invitations to nominate observers. The chairman of the executive committee of the council is the traumatic surgeon Mr. Watson-Jones.

Committee on Publications in Biology and Medicine

R. Wendell Harrison, Dean of the Division of the Biological Sciences of the University of Chicago, has been appointed to the Committee on Publications in Biology and Medicine of the University of Chicago Press. Dean Harrison has been on the faculty of the University since 1937, previously having taught at Washington University (St. Louis) and Southern Methodist University. He is a member of the editorial board of the *Journal of Infectious Diseases*, and widens the scope of the Committee by bringing to it his specialized interests not only in the fields of bacteriology and immunology, but in oral bacteriology and dental caries. Other members of the Committee include: William H. Taliaferro, Eliakim Hastings Moore, Distinguished Service Professor of Parasitology, Chairman of the Department of Bacteriology and Parasitology, Adviser to the President in Biological Sciences; Franklin C. McLean, M.D., Professor of Pathological Physiology; C. Phillip Miller, M.D., Professor of Medicine; Thomas Park, Associate Professor and Secretary of the Department of Zoology and Associate Dean of the Division of the Biological Sciences; Lester R. Dragstedt, M.D., Professor of Surgery.

Training Program Set Up by Navy for Physical Therapists

Arrangements have been made with the Surgeon General of the Navy, whereby students who have finished their six months of didactic training can receive supervised practice in naval hospitals. It is the understanding of the the Council on Medical Education and Hospitals of the American Medical Association that students will be assigned "under the supervision of a medical officer qualified in physical medicine, or an experienced physical therapy officer or both." This point has been emphasized together with the necessity of selecting adequately qualified instructors for the supervision of students since an educational program depends primarily on the teaching personnel.

The Navy is planning to offer clinical training at naval hospitals located in Bethesda, Maryland; Chelsea, Massachusetts; Corona, California; Great Lakes, Illinois; Long Beach, California; Memphis, Tennessee; Oakland, California; Philadelphia, Pennsylvania; Portsmouth, Virginia; San Diego, California; Seattle, Washington; St. Albans, New York, and Glenwood Springs, Colorado. The six months of supervised clinical experience-training will include four weeks devoted to massage, three weeks each to hydrotherapy, thermotherapy, and electrotherapy, and two weeks each to actinotherapy, mechanotherapy and remedial or corrective exercise. The remaining time will be divided among these divisions of physical therapy. The Bureau of Medicine and Surgery will supply information to the schools regarding the program and the progress of students and will assist wherever possible. It is clearly understood that the student should not receive a diploma, certificate or degree until the six months of supervised experience has been satisfactorily completed. Furthermore, the issuance of a diploma, certificate or degree is a function of the school in which the student was originally enrolled and is not a function to be assumed by the Navy.

Application for appointment should be made to the local office of Naval Officer Procurement.

Medical Advisory Committee Named for Compensation Commission

A medical advisory committee has been appointed to the United States Employees' Compensation Commission to advise on special medical problems incident to the handling of cases of silicosis reported under the federal workmen's compensation laws. Members of the committee include Dr. Royd R. Sayers, director of the Bureau of Mines, U. S. Department of the Interior, Washington, D. C.; Dr. Leroy U. Gardner, Saranac Lake, N. Y.; Lieut. Col. Anthony J. Lanza, M.C., and Dr. Clarence D. Selby, Detroit.

Dr. McQuarrie Named Editor for Brennemann's Practice of Pediatrics

Dr. Irvine McQuarrie, professor and head of the department of pediatrics, University of Minnesota Medical School, Minneapolis, has been appointed editor of Brennemann's Practice of Pediatrics, published by W. F. Prior Company, medical publishers, Hagerstown, Md.

Civilian Committee to Aid Army in Rehabilitating Blind Soldiers

The War Department recently announced that, in its efforts to rehabilitate blinded soldiers of the present war, the Army will be assisted by an honorary civilian advisory committee selected by the Surgeon General from among leaders in work among the blind throughout the United States. Addition of the advisory services of this committee emphasizes the determination of the Surgeon General that no blinded soldiers of this war will be returned to their communities without maximum adjustment and aid in the resumption of a normal and useful life in their respective communties.

Services of the members of the committee will be available to Dibble General Hospital at Menlo Park, Calif., and Valley Forge General Hospital at Phoenixville, Pa., which are the medical and surgical centers for blinded servicemen, and to Old Farms Convalescent Hospital, Avon, Conn., the Army's center for rehabilitation training for blinded veterans.

Occupational Therapists

Most patients in named general hospitals now have the benefit of modern occupational therapy. The establishment of this service in Army hospitals has been a vast undertaking. The procurement of qualified workers in civilian status has been but one of many obstacles. Courses for their indoctrination in military problems were planned. New buildings had to be designed and erected in many hospitals. Supplies and equipment have been obtained with great difficulty. The scarcity of items on the market and the demand coincident with expansion of the work have created serious deficiencies of materials needed to carry out an adequate occupational therapy program.

The great shortage of trained occupational therapists three years after entrance into the war is regrettable. While the new civilian occupational therapy courses established under the War Manpower Program will ultimately help, they did not meet the immediate personnel problem. The Army, therefore, established a War Emergency Training Course in which selectees were college graduates with a minimum of twenty semester hours in fine, applied, or industrial arts in which there was a knowledge of three or more manual skills used in occupational therapy. A twelve-month course was designed; four months are spent in theoretical instruction in civilian schools and eight months in practical application in military hospitals.

Presently on duty are 290 occupational therapy apprentices, 45 apprentices from regular courses of civilian schools, 243 registered occupational therapists, a total of 578 on duty.

National Neuropsychiatric Institute Bill

H. R. 2250, provides for a central research hospital in the group of the United States Public Health Service units at Bethesda. Reprints of the text are available from the National Committee for Mental Hygiene, 1790 Broadway, New York 19, N. Y.

Pamphlet Available

"The National Industrial Eye Health Program and Its Relation to Vocational Rehabilitation," by Jack Masur, M.D., Office of Vocational Rehabilitation, Federal Security Agency, Washington, D. C., reprinted from The Sight Saving Review, Volume 14, No. 3, Winter, 1944, may be obtained from the National Society for the Prevention of Blindness, Inc., 1790 Broadway, New York 19, N. Y., at 10 cents per copy.

Josef B. Nylin

Dr. Josef B. Nylin, aged seventy-one, one of the best known physical therapy physicians in the City of Philadelphia passed away at his home in Alden Park Manor, June 25. Dr. Nylin was chief of the department of physical medicine at the University of Pennsylvania Hospital since 1912. He also was consultant at the Shriners' Hospital for crippled children.

Dr. Nylin has long been a member of the Congress and the officers and members extend their sympathy to his bereaved family.

BOOK REVIEWS

ESSENTIALS OF BODY MECHANICS IN HEALTH AND DISEASE. By *Joel E. Goldthwait,* M.D., F.A.C.S., LL.D., Member of Board of Consultants, Massachusetts General Hospital, *Lloyd T. Brown,* M.D., F.A.C.S., Instructor Orthopedic Surgery, Harvard Medical School; *Loring T. Swaim,* M.D., F.A.C.S., Instructor Orthopedic Surgery, Harvard Medical School, and *John G. Kuhns,* M.D., F.A.C.S., Assistant in Orthopedic Surgery, Harvard Medical School. Fourth Edition. Cloth. Pp. 337 with 128 illustrations. Price, $5.00. Philadelphia: J. B. Lippincott Company, 1945.

This is one of Lippincott's Essential Series designed to provide concise and effective working manuals for busy physicians. The first three editions were published under the title of "Body Mechanics in Health and Disease." The authors for many years have enunciated the principle: "An individual is in the best health only when the body is so used that there is no strain on any of its parts. This means that when standing the body is held fully erect, with no strain on the joints, bones, ligaments, muscles or any other structures. There should be adequate room for all the viscera, so that their function can be performed normally, unless there is some congenital defect." Their experience in chronic arthritis has shown the value of this principle.

Dr. William J. Kerr, Professor of Medicine, University of California Medical School in a chapter on angina pectoris and postural emphysema related to obesity shows the application of this principle to special disease.

Body mechanics can play an important part in palliation in the care of older persons. Aging is a physiologic process which cannot be prevented. However, a new chapter in this edition on geriatrics shows that much can be done to retard disability, to delay outspoken disease and to keep functional and mental capacity at a high level as possible.

In this edition emphasis is placed on the maintenance of physical fitness and health, and in addition, attention is given to prevention of many deformities which have had faulty body mechanics as their underlying cause. The inadequacy of medical supervision and physical education during the past generation has been shown by the large number of rejections in the selective service examinations. The medical examiners have agreed that most of the defects causing rejection could have been prevented. Some deformities and defects of adults could have been prevented by good body-mechanics training in childhood. Even now, many of those rejected for various physical deformities could be rehabilitated or brought to greater usefulness and efficiency by the training described in this book.

In this edition many new pictures have been added and the chapter on disabilities of the feet has been entirely rewritten. The early recognition and treatment of faults which lead to disease are the chief business of the physician. In this prophylactic role of medicine the development of good body mechanics plays an important part. Therefore this book does much to show how modern physical medicine is of aid in overcoming the many common disturbances of health.

DEEP MASSAGE AND MANIPULATION. By *James Cyriax,* M.D., B. Ch. (Cantab), Assistant Medical Officer, Physiotherapeutic Department, St. Thomas Hospital, London, Physician in Charge of the Physiotherapeutic Department, King Edward Memorial Hospital, Ealing. Cloth. Pp. 242, with 98 plates. Illustrated. Price, $4.50. New York: Paul B. Hoeber, Inc., 1945.

Massage is given in many ways for many purposes. This monograph is concerned only with those manual technics, frictional and manipulative, that affect deep-seated structures. When massage is required for deep-seated tissues it must be given with penetrating effect.

The author believes that the most potent form of massage is deep friction. He states: "By this means, and by this means alone, massage can reach structures far below the surface of the body. Since the source of pain in patients for whom manual methods are required so often lies in muscle, tendon, ligament, joint-capsule or fascia, whether as the result of injury or rheumatism, penetrating technic is often required and is clearly essential if such tissues are to be affected." Superficial treatment over the whole site at which pain is felt is still practiced. Such treatment often is inadequate because pain is frequently referred from the actual site of the causative lesion. Deep friction massage must be applied to some special place. If it is applied to the wrong place it merely causes pain, sometimes considerable pain, without doing the slightest good to the patient. Deep friction massage, since it cannot fail to be painful, is justified only by the fact that it possesses great curative power when applied to the right spot in the right way. It can only be given with advantage to the site of the lesion. It should be kept in mind that deep friction is only one of the many ways in which a physical therapist uses her hands. Thus, it is entirely out of place when a general treatment is given during convalescence. Nor is it called for to assist in maintaining nutrition, power and range in muscles and joints near the site of an injury or derived of their nerve supply. For patients recovering from orthopedic operations and many types of injury deep friction would be valueless. It is when a deeply situated soft struc-

ture has to have its mobility restored that penetrating massage should be given. Hence traumatic or rheumatic lesions, acute or chronic, of muscle, fascia, tendon or ligament and sometimes joint capsule provide almost the only indications for deep friction.

There are 98 full page photographs showing the postures of the patient and the physical therapist. There are about six photographs of technics to give manual vibrations to the abdomen for dyspepsia or constipation caused by intestinal spasm, pyloric and duodenal spasm and gastric compression for distention of the stomach. These do not follow the premise of the author and in this country would have to be proven. The other pictures show the author's indications for deep massage and manipulation. Opposite each picture is a caption which gives the nature of the lesion, the frequency of treatment, the indication for massage, the posture of the patient and the physical therapist, the technic of the deep massage or manipulation, the duration of treatment, the results and when necessary caution. This book should be read by every physician and technician doing physical therapy.

THE CHEMISTRY OF ORGANIC MEDICINAL PRODUCTS. By *Glenn L. Jenkins*, Dean and Professor of Pharmaceutical Chemistry, School of Pharmacy, Purdue University and Walter H. Hartung, Professor of Pharmaceutical Chemistry, School of Pharmacy, The University of Maryland. Second edition. Cloth. Price, $6.50. Pp. 675 with no illustrations but many tables and graphic formulae. New York: John Wiley & Sons, Inc., 1943.

This is a textbook intended primarily for students of chemistry in the more advanced courses of pharmacy and medicine, but is so presented as to be of distinct value to less advanced students and practitioners. This second edition has been completely revised, rewritten and brought up to date. The material in the volume is organized according to the accepted scheme of chemical classification. There are sixteen chapters in all. Three chapters are devoted to the hydrocarbons and their derivatives, one to ether and ether peroxides, two to the carbonyl group, and one to each of the following: natural mixtures such as oils, fats, and resins, amines and their derivatives, cyanides and nitrocompounds, sulphur compounds, compounds of phosphorus, arsenic, and antimony, metallic derivatives of organic compounds, heterocycles containing heteroatom, stereoisomerism and physiochemical properties of medicinal products. Following each chapter is found a comprehensive list of references to books and journals. At the end of the volume, there is a six page general bibliography and a complete index.

The individual chapters present such subjects as isomerism, nomenclature, occurrence, the chemistry concerned in the methods of preparation, properties, physiologic activity and descriptions of the important products in each class of substances. Where possible an attempt has been made to show the relation of chemical structure to physiologic action. Most of the chapters have tables of the individual products with their formulae and such physical properties as melting point, boiling point and specific gravity.

This text cannot be too highly recommended to all those interested in the field covered. It is well written and complete, yet concise. For students of medicine, pharmacy, dentistry and advanced chemistry it should be extremely valuable. It can also be recommended especially to physicians, pharmacists and medical teachers as a reference work.

ULTRA-HIGH-FREQUENCY TECHNICS. By *J. G. Brainerd* (Editor); *Glenn Koehler; Herbert J. Reich*, and *L. F. Woodruff*. 12th Printing. Cloth. Pp. 570. Price, $4.50. New York: D. Van Nostrand Co., Inc., 1943.

This text covers the course outlined by the representatives of some forty institutions for training engineers and physicists in the ultra-high frequency field. Although the text is the result of the war-time demand for men with training in this field, it covers no specific military material. Its contents are primarily basic in nature and, therefore, the book should be useful to all interested in the field of ultra-high-frequency, civilians as well as military personnel.

A brief review of the elements of circuit theory and electron tubes is followed by a unified presentation of material considered the minimum basis for technical work in the u. h. f. field. Necessary material from other fields, for example communication engineering, is offered so that the student can continuously work through this book without referring to others.

The general "level" of the book is that of senior students in electrical engineering and physics. The book can be read with profit by physicians and physical therapists with the requisite background for the purpose of gaining a knowledge of the basis of ultra-high-frequency. Whether or not the microwaves, corresponding to these high-frequencies, have an application in medicine is not known definitely.

The book does not contain information directly applicable to short wave diathermy. Hence, it is not recommended for physicians and physical therapists seeking technical information of an elementary nature on this subject.

OLD AGE: SOME PRACTICAL POINTS IN GERIATRICS. By *Trevor H. Howell*, M.R.C.P. Ed., Captain, R.A.M.C. Deputy Physician and Surgeon, Royal Hospital, Chelsea. Paperboard. Pp. 56, with 16 tables. Price, 4s. 6d. net. London: H. K. Lewis & Co., Ltd., 1944.

This small monograph on geriatrics is divided into ten chapters as follows: (1) approach to old age, (2) care, comfort and management, (3) temperature in old age, (4) blood pressure, (6) rheumatic disease and physiotherapy, (6) chronic bronchitis, (7) cardiovascular disease, (8) progressive cerebral ischaemia, (9) the incidence of cancer and (10) disease and prognosis.

The author points out that "since the aged need medical attention more often than younger persons, it is obvious that thought must be given to the approach to sickness in old age." Some of the chapters are rather sketchy and the chapter on rheumatic disease and physiotherapy is particularly so. Nevertheless, this small monograph is loaded with sound advice and suggestions for the care of the aged and the well prepared tables give interesting documentation of various points to be observed in the care of aged persons. Because of the increasing interest of the medical profession as a whole in problems of geriatrics, this is a timely presentation and any medical practitioner will find in it many useful hints with regard to the proper treatment of aged persons who are sick.

LEGAL MEDICINE AND TOXICOLOGY. By *Thomas A. Gonzales,* M.D., Chief Medical Examiner of the City of New York; Professor of Forensic Medicine, New York University College of Medicine; Lecturer on Criminological Medicine, New York Police Academy. *Morgan Vance,* M.D., Deputy Chief Medical Examiner of the City of New York; Assistant Professor of Forensic Medicine, New York University College of Medicine; Lecturer in Forensic Medicine, College of Physicians and Surgeons, Columbia University; Lecturer on Criminological Medicine, New York Police Academy and *Milton Helpern,* M.D., Assistant Medical Examiner of the City of New York, Assistant Professor of Forensic Medicine, New York University College of Medicine; Lecturer in Legal Medicine, Cornell University Medical College; Lecturer on Criminological Medicine, New York Police Academy with a foreword by *Harrison S. Martland,* M.D., Chief Medical Examiner, Essex County (Newark), New Jersey; Professor of Forensic Medicine, New York University College of Medicine. Cloth. Price, $10.00. Pp. 754, with 244 illustrations. New York and London: D. Appleton-Century Company, Incorporated, 1940.

This is an excellent and authoritative text or reference source for any physician who may be called on to testify in a medical legal case, the student in his courses on legal medicine and particularly medical examiners or coroners. In the introductory chapters the reader is oriented as to the meaning and function of the medical examiner and coroner and the legal responsibilities of a physician to the government. The discussion of pathologic findings begins with a detailed description of the methods of identification of the deceased and technic of the autopsy. The gross and microscopic findings in case of traumatic deaths are based on actual case material of the authors. The different types of trauma are discussed in separate chapters, each chapter being profusely illustrated with excellent photographs. Abortion, sexual assaults and perversions are also discussed and case histories cited. The second half of the book is devoted to toxicology. The poisons are discussed in groups depending on their chemical and physical characteristics. The clinical picture and pathologic findings in cases of poisoning are included and also some detailed description of chemical analysis, when indicated. The practical aspects are fully emphasized as the contents of this book are based on the actual experiences of the authors. The paper, print and illustrations are surprisingly excellent for these times. This book is highly recommended as a sound scientific presentation which may well become the standard text in forensic medicine. It is, however, at the same time fascinating reading for the average physician.

THE NEW YORK HOSPITAL. A HISTORY OF THE PSYCHIATRIC SERVICE 1771-1936. By *William Logie Russell,* Professor of Psychiatry, Emeritus, Cornell University Medical College, Consulting Psychiatrist, New York Hospital. Pp. 556. Price, $7.50. New York: Columbia University Press, 1945.

This work gives an account of the earliest, and for almost fifty years, the only provision for the hospital treatment of the mentally ill in the state of New York. When the New York Hospital was established in 1771, chains, flogging and other severe measures were still considered necessary in the treatment of the mentally ill. The hospital was the first and for years the only one in New York and the second in British America. The history of its psychiatric service covers, therefore, the whole period during which humane and scientific considerations have been replacing the former severity and neglect. The introduction from Europe of a new principle and system of treatment by "management of the mind" or "moral treatment," undertaken by the governors in 1815, and for the practice of which they established Bloomingdale Asylum (now called New York Hospital—Westchester Division), influenced all future provision for the treatment of mental illness in America. Of special interest is the extent to which it has been possible to develop occupational, recreational and social measures of treatment. These were considered the principal resources in the "new system of treatment" for which Bloomingdale Asylum was established. Extension of the service beyond attention to patients admitted to the hospital began with the establishment of short courses of psychiatric instruction and practice for student nurses of general hospital schools, and of psychiatric outpatient and ward consultation service in connection with the other departments of the New York Hospital.

The material of the book is presented in nine parts: Introduction; The Close of the Eighteenth Century; The First Hospital in New York and Its Department of Psychiatry, 1771-1821; The Founding of Bloomingdale Asylum, 1815-1840; A Transition Period, 1840-1852; Planning for Classification and Removal — State Supervision and Laws, 1852-1877; A Medically Directed Private Charity, 1877-1894; The Dawn of Modern Scientific Psychiatry at Bloomingdale, 1894-1911; Fulfillment of Some Long-cherished Aspirations, 1911-1926; A Complete Organization for Service, Education, and Research, 1926-1936. It is illustrated by a number of contemporary etchings, and plans and some modern photographs. This inti-

mate account of the development of a well-controlled and liberally supported psychiatric service will be useful to teachers and students of psychiatry and mental hygiene and to those interested in social history and organization. Physicians, nurses, hospital managers and others officially concerned with the problems of mental illness will find encouragement and guidance in the experiences related here.

INADEQUATE DIETS AND NUTRITIONAL DEFICIENCIES IN THE UNITED STATES. Bulletin of the National Research Council, No. 109, November, 1943. Report of the Committee on Diagnosis and Pathology of Nutritional Deficiencies, Food and Nutrition Board, *H. D. Kruse*, M.D., Chairman. Paper. Pp. 56 with 17 tables but no illustrations. Price, 50c. Washington, D. C.: The National Research Council, National Academy of Sciences, 1943.

This is an extremely interesting and informative summary of numerous nutritional surveys made in the United States during the past decade, but mostly during the past five years. The scope of the work is indicated by the bibliography which contains 189 references. These articles which have appeared in many different journals have been summarized, correlated, and presented in this concise résumé.

A considerable percentage of the diets of the American people fail to provide more than 50 per cent of the daily allowances recommended by the Food and Nutrition Board and many more are less than 50 per cent deficient. This widespread incidence of dietary inadequacy is associated with deficiency states of varying intensity, some of them marked, but most of them mild or moderate and slow in progress. It is pointed out that certain conditioning factors such as exercise, trauma and disease, as well as the diet, influence the individual's nutritional state.

There is obviously a need for both preventive and corrective measures in dealing with these important nutritional problems. In the program of prevention, education of the public, adequate food production and distribution and enrichment of certain foods are the suggested remedies. Correction of nutritional states requires keener observation and diagnosis on the part of the profession. To help disseminate newer diagnostic methods for detection of nutritional deficiencies the following suggestions are made: (1) preparation of a handbook on methods of detecting deficiency states; (2) establishment of training centers for instruction in the medical aspects of nutrition, especially diagnosis of deficiency states; (3) introduction of adequate courses on nutrition, particularly its clinical aspects, into medical schools.

Seldom does one find so much information contained in such small space. Every physician who doubts the prevalence of nutritional deficiencies in the United States should study this report. It should be read also by dietitians, nurses, teachers and any others who are or should be interested in nutrition.

INSTRUCTORS MANUAL FOR PHYSICAL RETRAINING. Air Forces Manual No. 24. Published by Authority of the Commanding General, Army Air Forces, for the Air Surgeon, AAF Convalescent Training Division. Pp. 60. Published by Training Aids Division, Office of the Assistant Chief of Air Staff, Training Headquarters, Army Air Forces, One Park Avenue, New York City 16. September, 1944.

This booklet is intended as a guide for enlisted men who are acting as physical instructors in a Convalescent Hospital or the Convalescent Ward of a Regional or Station Hospital and the methods outlined are designed for the treatment of physical disabilities. These problems differ a great deal from those of a normal reconditioning program. The booklet outlines the anatomy and physiology of the parts of the human body most commonly injured in military operations: The bones, muscles, joints, nerves. The common causes of disability are briefly explained, along with the technics of physical and exercise therapy found most suitable for each type. The injuries common to the foot and ankle, the knees, hip, abdomen, and back, neck, shoulder, elbow, wrist and fingers are briefly described in popular terms and in each section there is a list of recommended exercises. Specific instructions for performing the exercises, as well as the reason behind each exercise, are discussed. This manual is to be used in conjunction with Manual No. 23, the "Handbook of Recovery," in which each exercise is identified by number, the numbers corresponding with those used in this manual and with illustrations showing how each exercise does its special job, such as strengthening a muscle, limbering a joint, or increasing circulation. These excellent little manuals should also prove invaluable for subsequent use in civilian and industrial rehabilitation work.

INDUSTRIAL NUTRITION. By *Ludwig Teleky*, M.D., Industrial Hygienist. Pp. 64. Price, $2.00. Chicago: H. M. Van Hoesen, Jr., Publishers Industrial Commentaries, 1944.

This small book is the first number of volume 2 in a series of industrial commentaries. It opens with a brief summary of some of the fundamental facts in the study of foods and food values. Specific needs for various groups of workers are discussed. The question is raised of what a factory can do about the economic problems of nutrition and can it help to provide a good diet. Many tables of food values are presented. Much space is devoted to costs of foods. Once again the value of a substantial breakfast is stressed. Apparently much more education will be necessary before this important step will be accepted as a "must." The importance of rest periods with detailed suggestions as to the time for various types of work are outlined. More extensive study is suggested by the inclusion of a list of reference books on the subject. Industrial nutrition is a subject which is daily receiving more attention. This brief outline may be used a guide in this direction.

ANNUAL REVIEW OF PHYSIOLOGY. *James Murray Luck*, Editor, Stanford University; *Victor E. Hall*, Associate Editor, Stanford University. Vol. VII, 1945. Published by the American Physiological Society and Annual Reviews, Inc. Cloth. Price, $5.00. Pp. 774. Stanford University P. O.: Annual Reviews, Inc., 1945.

The appearance of the annual review of physiology is fast becoming an event of major importance. The reputation of the reviewers and the care with which the individual subjects for review are selected make this series of volumes a necessary addition to the library of any one who wants to keep his knowledge of physiology up to date. This seventh volume is larger than its predecessors and among the 26 chapters are at least half a dozen which are of special importance to physical medicine.

Solandt in his review of muscle physiology regrets that the yield of fundamental research has been disappointing. The study of action potentials of muscle (electromyography) has proven valuable in degenerated muscle and poliomyelitis. Measurement of electrical excitability begins to reach a stage in which it is trying to emerge from the laboratory in the clinic. Studies on electrical treatment of denervated muscle appear to show that with the right technic this may be a useful procedure. Kufler has found that the myoneural junction is specifically sensitive to potassium and acetylcholine. No effect of acetylcholine or prostigmine on atrophy of denervated muscle can be found in carefully controlled experiments.

C. L. Taylor reviews the literature of the past year on exercise. An exercise best measures fitness for exercise. Tests can be divided in maximal (carried out to point of exhaustion) and submaximal in which a standard exercise is used and the score is based on physiologic response. Chemical effects of exercise have been studied and the influence of vitamin B deficiency seems clearly established, while vitamin A seems to have little effect. Evidence of nervous regulation of augmented ventilation during exercise seems to increase. Sodium, water and glucase requirements have been studied. The effort syndrome is found to yield successfully to psychiatric treatment. Blood loss leads to reduction of performance in endurance type tests. High school athletes were found to have lower mortality rates than would be expected from current life tables.

The reviews by Landis of the peripheral circulation show many points of interest in the field of physical medicine.

It has been suggested that ischemic pain of exercising muscle is due to liberation of potassium. Histamine increases the permeability of peripheral capillaries. Much work has been done on the role of the circulation in shock.

Hemingway's review of the physiologic effects of heat and cold is a timely one since the war has considerably increased the amount of work done in this field.

Of particular importance is a considerable amount of work done on hypothermia. The influence of drugs on recovery from hypothermia and the minimal recoverable body temperatures have been studied. The review discusses work on refrigeration anesthesia and devotes considerable attention to frostbite.

The newer literature on pain is carefully reviewed, including causalgia. The function of the basal ganglia in relation to the extrapyramidal system is discussed and the recent literature on the motor cortex is reviewed, followed by an excellent review of the recent literature on the physiology of the pyramidal system.

Comroe and Dripps in their review on applied physiology discuss some points of interest to physical medicine. The recent literature on anoxia is reviewed, followed by a review on industrial and military fitness, while the final section of this chapter is devoted to resuscitation.

It is to be hoped that the editors of this most important publication will never get tired of the real service they are rendering to all those who are interested in physiology either directly or indirectly.

SURGICAL DISORDERS OF THE CHEST; DIAGNOSIS AND TREATMENT. By *J. K. Donaldson*, B.S., M.D., F.A.C.S., Major, Medical Corps, Army of the United States; Diplomate American Board of Surgery; Associate Professor of Surgery and in Charge of Thoracic Surgery, University of Arkansas School of Medicine. Cloth. Pp. 364, 127 illustrations. Price, $6.50. Philadelphia: Lea & Febiger, 1944.

This book on the diagnosis and treatment of surgical disorders of the chest has been written, according to the author, "with the primary hope that it might fill a need of general practitioners and general surgeons, medical students, residents and interns for a somewhat epitomized volume dealing with fundamental advances, some of which have not as yet appeared in book form."

The textbook is well organized and well documented, without excess verbiage or an unwieldy bibliography. It is divided into three parts: Part I deals with chest injuries, inflammations, tumors and congenital anomalies of the chest wall; Part II deals with nontuberculous intrathoracic infections, pleurisy, including tuberculous empyema, pulmonary embolism and infarction, intrathoracic tumors and congenital abnormalities; Part III deals with collapse therapy in pulmonary tuberculosis and comments on anesthesia, prevention and treatment of postoperative pulmonary complications, resuscitation and inhalation therapy.

One may well agree with the author that there should be just as definite a place in the libraries of most physicians "for such a single reference work regarding the chest, as there is for single volume texts pertaining, for example, to disorders of the genito-urinary system, gynecologic problems, or diseases of the eye, ear, nose and throat."

This is an excellent and well prepared reference work on the surgical disorders of the chest and merits the attention not only of surgeons but also of practitioners in general. It can be recommended very highly.

PHYSICAL MEDICINE ABSTRACTS

The Abuse of Rest as a Therapeutic Agent. Frank H. Krusen.

Proc. Staff Meet., Mayo Clin. **20**:91 (March 21) 1945.

Recently there has been renewed interest on the part of the medical profession, in problems of rest versus activity in the treatment of the sick. Two events have contributed toward this renewal of interest. One was the presentation of a symposium on the abuse of rest at the last meeting of the American Medical Association. The other event was the establishment in our Army hospitals of convalescent and reconditioning programs which utilize physical and mental activities for patients more fully than has ever been the case in civilian hospitals. In the past certain great medical leaders have stressed, perhaps unduly, the importance of rest as a therapeutic measure. Three vigorous advocates of rest as a form of therapy stand out in the memory of present-day physicians. They are Weir Mitchell, Hugh Owen Thomas and Allen K. Krause. The doubts which are now being expressed concerning the wisdom of blind and often unreasoning adoption of unlimited amounts of rest in therapy, simply because of the support given to rest therapy by great physicians of a less enlightened age, call for a careful review of our modern knowledge concerning this subject. Blind following of the great physicians of the past has always been one of the weaknesses of the medical profession. Yet in guarding against this tendency we must not hurriedly cast aside proved and valuable methods of therapy.

Evaluation of Treatments in Thromboangiitis Obiterans (Buerger's Disease). Emil J. C. Hildenbrand.

Southern M. J. **38**:179 (March) 1945.

Exercises of the Buerger-Allen type modified by Wright are indicated in all cases. Baths should be limited for 30 minutes twice a day to compresses of saline or boric acid if ulceration and infection are present. For mild cases, some of the advertised warm mineral baths are beneficial, but similar results can be obtained in a bathtub or whirlpool bath. Water will macerate poorly nourished tissues and open avenues of infection. The passive vascular exercising apparatuses are of value only when the predominant observations prove to be organic occlusion and the vasomotor conditions have been eliminated, as they increase blood flow through relatively rigid arteries by rhythmically increasing intra-arterial pressure or decreasing the pressure within the ischemic tissue. Ultraviolet blood irradiation brings some promise, but further investigation is necessary. Heat is very helpful in all cases, but its proper application is essential. The affected extremities should be exposed to none other than room temperature or below. A beneficial reflex vasodilatation by immersing opposite extremities in water at 113 F. may be accomplished. Local heat to the trunk by means of blankets, hot water bottles, electric pads, or heated cradles is to be encouraged, which also accomplishes vasodilatation. Using the desired results of the typhoid vaccine treatment as a criterion for the proper treatment of thromboangiitis obliterans, the author has used the fever cabinet. A patient covered with blankets and electromagnetic cable with affected extremities exposed can expect the same result except be a little more uncomfortable because of weight on his trunk.

Physical Therapy and Reconditioning. Ben L. Boynton.

Crippled Child **22**:160 (April) 1945.

Patients are divided into four classes: Class IV are those who are bed patients or who are confined to the ward—for these patients a program heavy in educational phases is currently being provided. Also, the medical officer in charge of the ward prescribes what bed exercises may be undertaken by the individual patient, and these are conducted by trained physical reconditioning personnel. Occupational therapy both functional (corrective) and diversional is being provided in increasing amounts for this class of patients. Class III patients may be defined as those who are ambulant but who still need definitive hospital care (dental, x-ray, physical therapy, etc.). Since these patients are able to be up and around, the reconditioning program is about equally divided between physical and educational pursuits. Well equipped gymnasia are used throughout the day for various groups of Class III patients. Post theaters, Red Cross buildings, various hospital shops, and some of the administrative offices offer additional facilities where the hospital ambulant patients may profitably employ their time in educational and productive pursuits. Trained personnel in educational reconditioning carry the burden of proper planning and execution of the educational phase of the program. Class II and Class I are those patients who may be said to be convalescent but who are not yet able to return to duty or who have not yet reached their maximum benefit of hospitalization. It has been found that these patients recover more rapidly if they can be housed away from the hospital, dressed in duty uniforms, and provided with a well rounded program of physical activities and pre-technical training activities.

The Role of Physical Therapy and Occupational Therapy in the Army Reconditioning Program. Donald L. Rose.

Physiotherap. Rev. 25:107 (May-June) 1945.

It is worth emphasizing that the desirable thing is not always the practical thing. This is clearly exemplified in the exercise program for amputation cases. The fundamental importance of the selective development of certain muscles and muscle groups related to the injured extremity is accepted without question. It would be highly desirable to be able to afford the time and skilled personnel to administer and supervise such therapeutic exercises on an individual basis. Important though these cases be, however, they constitute but one type of patient, and the same personnel must be made available to all who need physical therapy. In consequence, it has been necessary to develop an exercise program wherein the efforts of the reconditioning division and the physical therapy department are combined. After mutual agreement on the types of exercises are then conducted on the ward or area other than the physical therapy clinic, by representatives of the reconditioning division with a physical therapist checking each patient for the correct performance of each exercise. Those patients who exhibit defects which cannot be corrected by this ward or mass exercise program are sent to the physical therapy clinic for the individual attention they need. In this fashion, the energies of the physical therapist are not diverted to and lost in activities that can be successfully accomplished by other personnel. Further, the number of patients that can be treated by such a procedure is considerably greater than is the case when strict individualization of treatment is attempted.

The same principle of the conservation of time and personnel is employed whenever possible. The remaining cases for which physical therapy is prescribed must be selected carefully in order not to include two classes of patients: those who would recover as rapidly without as with physical therapy and those in the treatment of whom physical therapy is not indicated. The treatment administered must be practical and devoid of procedures which, although impressive to the patient, are of no definite therapeutic value otherwise. Finally, with few exceptions, treatment must not be prolonged beyond certain practical limits. To do otherwise is to court disrespect for our specialty with but meager dividends in the form of higher incidence of patient recovery.

Electric Convulsive Therapy in Psychoneuroses. Lothar B. Kalinowsky.

M. Ann. District of Columbia 14:75 (Feb.) 1945.

The practical conclusions regarding the value of electric convulsive therapy in the psychoneuroses are less definite than they are in the psychoses. In manic-depressives and involutional depressions favorable results can be achieved in the vast majority of cases. Results are poor in anxiety neurosis and in conversion hysteria, and here it should be used only reluctantly because these patients might react to the treatment experience with new or aggravated symptoms. However, tension can be relieved temporarily and the psychotherapeutic approach facilitated. Obsessive-compulsive neurotics react favorably in a small number of cases, and the treatment may be tried when the patient's resistance to psychotherapy cannot be overcome otherwise. The selection of suitable cases requires considerably more experience in the neuroses than it does in the psychoses.

Granuloma Inguinale. John G. Menville.

U. S. Nav. M. Bull. 44:622 (March) 1945.

Granuloma inguinale is a granulomatous lesion which involves principally the inguinal region and the genitalia. The disease is also known as ulcerating granuloma, granuloma pudenti tropicum, sclerosing granuloma contagiosa, chronic venereal sore, and granuloma venereum.

In chronic chemoresistant cases best results were obtained by the author by thoroughly excising the lesion with a loop electrode, using a high frequency cutting current and treating the resulting wound as a thermal burn.

A Plan for Rehabilitation for Rheumatic Subjects. J. G. Fred Hiss.

J. Pediat. 26:231 (March) 1945.

A rehabilitation plan for a rheumatic subject has two distinct parts, sometimes interdependent and sometimes entirely distinct.

Practically all of the children of the community attend public school from the age of 5 or 6 to the age of 14 to 18 years. Because of the routinely repeated physical examinations it is possible to detect cardiac lesions regardless of whether they have, or have not, been preceded by symptomatic rheumatic infections. There is the opportunity to correct erroneous diagnoses previously made. Schools are ideal for providing vocational guidance to those children with physical handicaps and for providing corrective measures for those who have developed mental handicaps because of rheumatic fever. The school health service provides a way to disseminate the best information available about rheumatic fever and its problems, directly to school physicians and indirectly to other physicians in the community.

The schools furnish an outlet for publicizing aspects of the disease to nurses, to teachers and to mothers.

Treatment of Fractures of the Tibial Condyles. Robert A. Knight.

South. M. J. 38:254 (April) 1945.

Early protected motion without weight bearing is a satisfactory method to restore function. Immediate postoperative immobilization consists of a long leg cast with a pelvic band with the knee in 15 degrees of flexion. In two or three weeks, after the wound has healed, the cast is removed and the extremity is suspended in balanced traction for active and passive motion. Daily physical therapy is applied, the patient is instructed in quadriceps exercises and care is taken to prevent

forcible flexion of the knee. At the end of five to six weeks, the patient is allowed up without weight bearing, wearing a long leg controldial knee brace.

Fractures of the tibial condyles frequently are followed by serious disability. Minor degrees of depression and displacement usually do not warrant operation, and should be treated conservatively. If the depression or displacement of the fragments of the condyle is appreciable, operative intervention is necessary. The operative technic and postoperative care are discussed. The principles of treatment of malunited fractures of the tibial condyles are considered.

The Chronic Running Nose in Children. Arthur G. Wells.

Practitioner 154:83 (Feb.) 1945.

The author presents a review of some of the therapeutic measures employed to promote the reaction of inflammation.

The application of radiant heat promotes inflammatory reactions and assists in the removal of organisms and other noxious material. It seems to be more effective in acute than in chronic conditions.

Adrenal Cortex and Work in the Heat. M. Moreira; R. E. Johnson; A. P. Forbes, and F. Consolazio.

Am. J. Physiol. 143:175 (Feb.) 1945.

This paper deals with the effects of adrenocortical extract on men working in the heat.

Extract of adrenal cortex was studied because of reports that its administration is beneficial in therapeutic hyperthermia. Edelmann, Mahanna, Lewis, Thatcher and Hartman ameliorated the nausea and fatigue and accelerated the recuperation of luetics by injecting adrenocortical extract during their course of weekly fever treatments.

The effects of large doses of extract of adrenal cortex were studied in healthy young men living on a constant adequate diet and marching three and one-half hours daily in moist heat. In comparison with the striking influence of water drunk during work the extract had no effect beneficial or otherwise on the performance or feelings of the subjects. The adrenal cortical extract had no consistent effects on the following physiologic or chemical functions in the course of marching or during the whole day: a, heat balance as measured by pulse rate, rectal temperature, rate of sweating and skin temperature; b, respiration exchange as measured by pulmonary ventilation, oxygen consumption and carbon dioxide excretion; c, blood pressure, either systolic or diastolic; d, serum chloride, sodium, potassium or nonprotein nitrogen; e, daily urinary excretion of sodium and of chloride. On days when extract was injected, the urinary excretion of potassium was increased. Suggestive but not unequivocal evidence was obtained that the extract lowered the concentration of chloride and sodium in the sweat and raised the concentration of potassium. A previous hypothesis concerning the normal regulation of sweat chloride is extended to sweat sodium. Both are present in sweat in almost identical concentrations usually much lower than in the serum and appear to be correlated with 3 important factors; a, personal idiosyncrasy; b, a central factor measured by rectal temperature and rate of sweating and c, a peripheral factor associated with skin temperature.

The Rapid Treatment of Early Syphilis During Pregnancy. Mortimer D. Speiser; Gertrude Wexler; Evan W. Thomas, and Hyman A. Asher.

Am. J. Obst. & Gynec. 49:225 (Feb.) 1945.

Forty-three pregnant patients were treated for syphilis with massive mapharsen therapy. One death from arsenical encephalopathy occurred in this group. Of the 30 patients who completed treatment good results were obtained in a minimum of 76.6 per cent.

In the relatively small series reported, intensive therapy proved safer and more effective than routine treatment.

Massive mapharsen therapy in the treatment of early infectious syphilis prior to the onset of pregnancy has yielded excellent results, since there was only one failure among 32 patients so treated.

Refrigeration Anesthesia and Evaluation of Amputation Sites by Arteriogram. E. Howard Cayford, and H. Gurth Pretty.

Ann. Surg. 121:163 (Feb.) 1945.

The authors describe their experience in the use of refrigeration for amputation of limbs and also detailed the technic which they generally use. They have enumerated and discussed the fatalities. The mortality rate was higher than in most series of amputations, but the explanation is clear when one considers the cases offered for this method. The incidence of shock was absent in every case. The percentage of gas bacillus infections has been dealt with and is undergoing further study. The general feeling is that the organism lies dormant in the devitalized tissues. The tourniquet has been largely dispensed with in this series.

Experimental Production of Scoliosis in Rats and Mice. John R. Schwartzmann, and Meryl Miles.

J. Bone & Joint Surg. 27:69 (Jan.) 1945.

Scoliosis can be produced experimentally in laboratory rats and mice by the selective release of mechanical action of different muscle groups on the vertebral column. A satisfactory degree of control can be maintained to allow the prediction of the type of curve to be produced. Selective muscle imbalance can be produced without muscle excision by the use of inert material to prevent muscle reattachment; this imbalance will produce lateral curvature. Muscle excision and release which did not produce imbalance resulted in no scoliosis in the animals studied.

Sacral Fractures and Injuries to the Cauda Equina. Grant J. Bonnin.

J. Bone & Joint Surg. 27:119 (Jan.) 1945.

According to the author fracture of the sacrum is most common in association with fracture of the innominate bone, a sufficient clue to its most common method of production.

Once the pelvic displacement is reduced, the sacrum must be left to itself. In some cases, for example, those with only minor compression of the sacrum, no pelvic reduction is necessary; such patients should be treated as soon as possible by active exercises in bed, and by such physical therapeutic aids as may facilitate the active use of the muscles. In no case is the muscle paralysis so complete that deformities will arise if the patient is given exercises. Where paralysis exists, its incomplete nature is suitably dealt with by exercises against graduated resistance, together with a little radiant heat and massage. As soon as the pelvis is consolidated, usually at the end of eight weeks, walking is encouraged.

Measurement of Muscle Strength. Henry Milch.

J. Bone & Joint Surg. 27:141 (Jan.) 1945.

The inability accurately to control or positively to determine all factors narrows the field of application of the usual type of muscle-strength determinations. Insofar as the actual measurement of individual muscle strength is concerned, the hope placed in ergographic determinations appears to be entirely chimerical. The pseudoscientific enumeration of the work capacity of a long list of individual muscles as a basis for surgical intervention is misleading and should be discontinued. At most, muscle charts should indicate the relative strength of flexion, extension, adduction, abduction, or rotation possible at the joint under consideration. They can never be elaborated so as to replace clinical judgment, which must finally be brought to the analysis of the surgical problem.

Traumatic Neurocirculatory Disorders of the Extremities. J. Dewey Bisgard.

Am. J. Surg. 27:210 (Feb.) 1945.

Certain definite clinical entities are at times designated posttraumatic neurovascular lesions of the extremities.

Sudeck's bone atrophy is seen not infrequently in association with fractures about the wrist joint but may follow relatively trivial and minor injuries.

The treatment of posttraumatic neurovascular lesions varies with the individual case. The acute vascular contractures with impending gangrene are emergencies, demanding immediate efforts to relieve vascular spasm by means of novocainization of the regional sympathetic ganglia or periarterial sympathectomy. Heat should not be applied to these extremities.

Before treatment is undertaken in chronic cases a careful neurologic and psychiatric study should be made in an effort to exclude compensation neuroses and hysteria. All doubtful cases, and there are many, should be looked on as true causalgias and treated accordingly until a diagnostic therapeutic trial has proved them otherwise. To dismiss them simply as psychogenic does a great injustice to these sufferers.

Minor causalgias and particularly the bone atrophy of Sudeck following fractures or other injuries may be prevented by the early institution of physical therapy and once developed this form of therapy probably shortens the otherwise long period of recovery.

Because the patients in the more severe cases are likely to become addicted to morphine, every effort should be made to obtain early relief of pain.

Gas Gangrene After Amputation Under Refrigeration Anaesthesia: A Warning.

Brit. M. J. 4376:662 (Nov. 18) 1944.

Many surgeons are adopting the freezing method to anesthetize a limb before amputation. There is no doubt that in certain cases, notably diabetic gangrene, this has distinct advantages. The following report shows that unsuspected danger may lurk here. Numerous amputations had previously been done at the hospital, using ice from the same source, with no untoward result. It thus seems that any surgeon proposing to use the method should first make sure the ice supplied is free from pathogenic bacteria, especially spore-bearing varieties. Most of the ordinary pyogenic bacteria probably succumb to the usual skin cleansing. Ice may be contaminated from its container or during transit from the factory; but in this case the contamination was proved to be in the ice.

Arthritis: Plans of Therapy. Charles P. Wilson.

Northwest Med. 44:54 (Feb.) 1945.

In conditions of traumatic arthritis and osteoarthritis, a major therapeutic principle is to get patients to stop irritating the injured joints. They may have to give up the type of work they are doing but before an effort is made to get them to stop massaging the joints or working them "to keep them limber" and to stop using the joints except at work, prohibit gardening, sewing, knitting, and always give them something to rub on them.

The author condemns thoughtless removal of hypothetic foci of infections by not mentioning the subject before and failure to elaborate on its merits or demerits tells you what he thinks of wholesale slaughter of teeth. The same statement applies to the "alphabet of treatment" venoms, sulfur and iodine.

Heat by any means may be wise or unwise. Massage, passive and active exercise and hydrotherapy have their proper places. Joint positioning to prevent subluxations, deflections and hyperextensions of damaged joints is vital. Home made splints, metal splints or plaster shells are to be used with thoughtful consideration of the desired and often predictable end in mind. Spa treatment has its usefulness at the proper time, chiefly during the rehabilitation stage.

Rehabilitation Units in the Merchant Marine. Daniel Blain.

Crippled Child **22**:161 (April) 1945.

In order to take care of the men, most of whom were suffering from mild forms of neuropsychiatric disorders, chiefly from the syndrome labeled convoy fatigue, which is comparable to "operational" and "combat fatigue" of the Army and Navy, it was felt necessary to develop small institutions, which are designated as Rest Centers. These rest centers, taking up to 50 to 55 men at the most are small, non-institutional homes, located in quiet, rural atmospheres, on or near the sea. In the rest centers there is a minimum of hospital atmosphere.

The Work-Recreation Program in the rest centers is under the direction of the medical officer in charge. There is supplied equipment, materials and the opportunity for work and recreation but the men are never urged to participate in activities in which they have no interest. Among the factors which are most important is food, of which there is served a great quantity in six meals a day. Emphasis is placed on gain in weight, rest, work, intellectual interests and ego-strengthening devices of all kinds.

The Conservative Treatment of Thromboangiitis Obliterans and Arteriosclerosis. Paul S. Lowenstein.

South. M. J. **38**:48 (Jan.) 1945.

The importance of adequate rest is exemplified in the treatment of occlusive vascular disease. Rest may vary from partial restriction of activity to the complete stay in bed required in the presence of active inflammatory processes or the severe, incapacitating pain of incipient gangrene.

The position of the limb during this period must also be emphasized. In general, it should be such that the arterial flow is aided, but the venous and lymphatic returns are not impeded.

Of more recent development is the intermittent venous occlusion (rhythmic constrictor) which possesses certain unquestionable advantages. If the pressure in the cuff is kept well below the diastolic pressure, pain is rarely produced in properly selected cases. The cuff is easily adjusted and the treatment may be taken at home.

Chronic Rheumatoid Arthritis and the Nervous System.

Charcot attributed the deformity of chronic rheumatoid arthritis to a reaction of the originally impaired nervous system, and more recently May and Laffite have identified a trophoneurotic type of rheumatic arthritis. A study of 16 cases of chronic rheumatoid arthritis led Martin to the following conclusions, which were presented before the Société médicale de Genève:

1. Certain disorders of the diencephalon, such as Parkinson's disease, assume the traits of a rheumatoid disorder before revealing their character as a disease of the nervous system.

2. A succession of purely nervous symptoms is frequently observed to dominate the clinical picture in certain cases of rheumatoid arthritis.

3. In a large number of cases of chronic rheumatoid arthritis neurologic signs are observed, such as modification of the reflexes, trophic disturbances, trembling, insomnia, cachexia, disturbances in the blood composition, disturbances of the regulation of the carbohydrates and even tetanic or fainting attacks.

The question arises whether the morbid element has its primary or secondary localization in the brain. At present the problem of the nervous origin of chronic rheumatoid arthritis remains unsolved.

Refrigeration Anesthesia in Surgical Procedures. Damon B. Pfeiffer, and F. M. Simmons Patterson.

Pennsylvania M. J. **48**:352 (Jan.) 1945.

As a result of experimental work in an effort to find improved means of handling cases of diabetic gangrene, some of the advantages and limitations of refrigeration anesthesia have been learned. Basically, refrigeration anesthesia reduces metabolism to a point which is just compatible with tissue viability. Nerve impulses are abolished. One of the fundamental properties of protoplasm, which is irritability, is arrested by cold. Under refrigeration, shock is nonexistent, and the duration and degree of tissue trauma immaterial.

In his summary the author points out that refrigeration is the chilling, not the freezing, of tissues. Refrigeration anesthesia is indicated in aged, poor-risk diabetics with gangrene of an extremity that requires amputation.

In persons with gangrene of an extremity due to arteriosclerosis or peripheral vascular disease, and who are bad risks, refrigeration is the anesthetic of choice.

The technic of limb amputations under ice is described, and the advantages of this procedure are listed. Refrigeration anesthesia is often a life-saving procedure when gangrene, infection, toxicity and possibly septicemia exist. The patient may be improved to the point where conservative or radical surgery is rendered possible. Refrigeration of badly crushed extremities retards shock and bacterial growth and permits the patient to be improved generally by transfusions. It offers many advantages in the treatment of burns. Severe cases of frost-bite have responded to the application of cold.

Poliomyelitis. John G. Young.

Texas State J. Med. **60**:529 (Feb.) 1945.

Kabat and Knapp present the conception of spinal cord pathologic changes which are characterized by two types of lesions: (a) an anterior horn cell lesion resulting in motor denervation with muscle atrophy, and (b) an internuncial lesion resulting in muscle spasm.

Prostigmine was used in only a few of these patients and its efficacy cannot be evaluated from the small series. It was accompanied by marked improvement and lessened muscle spasm in 4 cases.

It has been taught that the duration of active continuing possible spread of the disease within the nervous system is limited to only five or six days. This series disproved such teaching, for some of these cases continued to manifest new involvement with frequent thorough testing for as long as twelve days. This development was considered important in this series and should be considered in giving a prognosis.

The Kenny treatment was instituted on diagnosis and carried out in detail and thoroughness with frequent competent muscle testing. All beds were provided with boards under the mattresses and foot boards where needed. All patients were given vitamin B complex and a diet rich in vitamins. Isolation from the rest of the hospital was rigid. There was no hospital spread of the disease. It is the opinion of those who observed this group that the Kenny treatment gave excellent results in relieving pain and making for comfort and rest. It was perceptible that these patients frequently quieted down and had relief of pain with this treatment, and if no other results were secured, this alone is a great advance in treatment. There was, however, the opinion that the Kenny treatment gave good results in preventing contractures, lessening muscle spasm and materially shortening the recovery time.

Three Procedures That Help Curb Airborne Infection. Albert W. Snoke.

Hospitals **19**:39 (March) 1945.

Measures outlined to reduce the number of airborne bacteria are: (1) floor treatment to hold dust and lint, (2) oil treatment of bedclothes and (3) disinfection of the air. It is hoped that an evaluation of the advantages and disadvantages of ultraviolet light on the basis of proper standards of sanitary ventilation will provide a future guide to the hospital director. The experience of the Army and the Navy in barracks and hospitals in the use of ultraviolet light for the reduction of cross-infection will also be of value.

Peripheral Nerve Injuries. Frank H. Mayfield.

J. Michigan M. Soc. **44**:275 (March) 1945.

Rehabilitation must begin at the time of injury by preventing deformity and fixation of joints. Fractures of bones which require fixation in plaster, in association with nerve injury, are common. However, few require that the finger joints be encased and this should be avoided. The patient should be instructed to use the unparalyzed hand for passive exercise of the paralyzed part. In 20 patients of a group of 100 cases of injury to one or more of the major nerve trunks of the hand, disabling stiffness of the finger joints existed. An analysis of their case histories made it clear that only one important principle of treatment had been violated; namely, they had not been instructed and required passively to exercise the paralyzed extremity.

Passive exercise to the foot is best applied by walking, all patients who can support themselves are fitted with appropriate splints and required to walk. Passive exercise supersedes all other forms of physical therapy.

It is imperative that patients wear appropriate splints to prevent overstretching of paralyzed muscles and contractures of unparalyzed muscles. An elastic cock-up splint which was developed at Percy Jones Hospital is used for radial palsy. The wire dropfoot brace is used for peroneal paralysis. The airplane splint is worn by all persons with deltoid paralysis. There is no satisfactory splint for median and ulnar palsies. Full leg braces with knee drop locks are used for femoral palsies.

Abdominal Pain in Children. Joseph Brennemann.

J. A. M. A. **127**:694 (March 24) 1945.

Carnet published a series of papers dealing with "intercostal neuralgia" as a source of error in the differential diagnosis of appendicitis. He maintained that if the abdominal wall was tensed by straining or by elevating the legs in the dorsal position the tenderness would disappear in appendicitis and remain in "intercostal neuralgia." It is a difficult sign to elicit in children.

A Quick and Simple Treatment of Low Back Pain Based on a New Conception of its Genesis. Aladar Farkas, and George W. Easley.

West Virginia M. J. **41**:107 (April) 1945.

After the clinical and roentgenographic examination the patients were placed in beds whose front legs were raised 12 to 20 inches. Beneath the mattress a board was placed. The patients retained a small cushion for their heads if necessary and were kept in bed day and night. Daily for twenty minutes a heat cradle was applied. The duration of the treatment varied from seven to fourteen days, but in no case exceeded a fortnight.

The pathogenesis of the low back complex (lumbago, sciatica, protruded disc) is explained on the ground of a primary lumbar kyphosis, a straight lumbar spine preceding all signs and symptoms. The reverse of lumbar lordosis is caused by stooping and sitting occupation. Among the signs accompanying the disappearance of lumbar lordosis attention is called to the spasm of the lateral abdominal muscles and to the spasm of the lateral abdominal muscles and to the lumbar shift of the dorsal kyphosis. In more than 60 cases complete relief from the local and nervous symptoms could be obtained by putting the patient in a bed, the front legs of which were elevated from 12 to 20 inches for from seven to fourteen days. Recurrences were rare and easily handled by the same method.

AMERICAN REGISTRY OF PHYSICAL THERAPY TECHNICIANS

30 North Michigan Avenue — Chicago 2, Illinois

DIRECTORY

Addresses shown do not indicate the fact that many technicians are in the armed services. A permanent home address has been given when possible. "Jr." appearing in parenthesis following a name designates a junior physical therapy technician. A junior technician is a person with limited training in physical therapy but who has had a minimum of high school training and four years acceptable physical therapy experience. Registration in this class was closed Dec. 31, 1939. All others are senior physical therapy technicians.

Only graduates of courses approved by the Council on Medical Education and Hospitals are eligible for application for registration. A list of these approved courses is found elsewhere in this issue.

January 31, 1945.

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Utecht, Frances, Camp Carson Conv. Hospital, Camp Carson, Colo.
Utz, Virginia, 1624 Franklin St., Oakland, Calif.
Uvick, Agnes, Regional Hospital SAACC, San Antonio, Texas.

V

Vacha, Victoria, 320 S. Ashland Ave., Chicago, Ill.
Vail, Edith, U. S. Naval Hospital, NOB, Norfolk, Va.
Valentine, Margaret (See Rennison).
Van Der Stelt, Helen, Mayo Clinic, Rochester, Minn.
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Vandiviere, Blanche, 713 E. Park Ave., Tallahassee, Fla.
Van Duyn, Genese (See Sarboe).
Van Duyne, Margaret, Plainfield Ave., Stelton, N. J.
Van Eyck, Ann, 1216 Kanawka Blvd., Charleston, W. Va.
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Van Iten, Miriam, R. # 1, Box 182, Arlington, Cal.
Van Nakin, Ruth, R. #2, Bainbridge, N. Y.
Van Ness, Katharina, 80 Nunda Blvd., Rochester, N. Y.
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Van Vranken, Anne, 832 Rittenhouse St., N. W., Washington, D. C.
Van Wie, Jane, Lafayette St., Palatine Bridge, N. Y.
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Vargason, Clara (Jr.), 11097 Nottingham, Detroit, Mich.
Varnerin, Emma, 47 Townsend St., Roxbury, Mass.
Vasey, Charlotte, Childrens Hospital, Iowa City, Ia.
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Vaughn, Helen, Georgia Warm Springs Foundation, Warm Springs, Ga.
Veary, Zola, 2922 Rockwood Pl., Toledo, O.
Veatch, Florence (Jr.), % Senator Hotel, Bremerton, Wash.
Veissi, Barbara, Address unknown.
Velardi, Mabel (Jr.), Southern Permanente Hospital, Fontana, Calif.
Vermilye, Louise(Jr.), 160 Washington St., Russellville, Ala.
Vestal, Dorothy, 3625 Gull, Kalamazoo, Mich.
Vincent, Sister (See Ryan).
Visel, Viola, House of Good Samaritan, Watertown, N. Y.
Vlahos, Beatrice, Georgia Warm Springs Foundation, Warm Springs, Ga.
Vogan, Helen, Youngstown Hospital, Youngstown, O.
Vogel, Emma, Office of Surgeon General, 1818 "H" St., Washington, D. C.
Volland, Doris, 11 Oakencroft, Rd., Wellesley, Mass.
Von der Recke, Elfriede, 51 Audubon Ave., New York, N. Y.
von Lehe, Eileen, 502 N. 5th St., Corvallis, Ore.
Voorhies, Freida, Greystone Park, New Jersey.

W

Waddell, Jessie, P. O. 1258, Lansing, Mich.
Wadsworth, Gladys, Percy Jones Gen. Hospital, Battle Creek, Mich.
Wagener, Lora, Springfield City Hospital, Springfield, O.
Waggoner, Dorothy, Station Hospital, Camp Roberts, Calif.
Wagner, Margery, Univ. of California Hospital, San Francisco, Calif.
Wagner, Maysel, U. S. Marine Hospital, Stapleton, Staten Island, N. Y.
Wahlroos, Viena, Address unknown.
Wakefield, Gladys, 1103 E. Main St., Albertville, Ala.
Waldrop, Gladys, Touro Infirmary, New Orleans, La.
Waldrop, Rebecca, 231st Gen. Hospital, APO 350, % PM, New York, N. Y.
Walker, Gladys, 139 N. Homan, Chicago, Ill.
Walker, Irma, 611 Arlington Pl., Chicago, Ill.
Walker, Margaret, Univ. of Texas Health Service, Austin, Texas.
Walker, Marguerite, 8917 Euclid Ave., Cleveland, O.
Walkila, Turna (Jr.), Box 58, Leoneth, Minn.
Walkins, Virginia, Crippled Children's Hospital, Jamestown, N. D.
Wall, Jean, 67th Gen. Hospital, APO 519A., % PM, New York, N. Y.
Wallace, Catherine, Dibble Gen. Hospital, Menlo Park, Calif.
Wallace, Margaret, 636 Church St., Evanston, Ill.
Wallace, Mary, Dickinson, Alabama.
Wallis, Eunice, 173rd Gen. Hospital, APO 350, % PM, New York, N. Y.
Wallis, Mary (See Hippmann).
Walter, Evelyn, Hammond Gen. Hospital, Modesto, Calif.
Walton, Frances, 3675 W. 111th St., Chicago, Ill.
Walton, Ruth, 55 N. Old York Rd., Hatboro, Pa.
Waples, Mary, 453½ S. Hoover, Los Angeles, Cal.
Ward, Arleen, 21 Lillian Ave., Providence, R. I.
Ward, Mabel, 1715 Pampas Ave., Santa Barbara, Calif.
Wardley, Doris, 3927 Canterbury Rd., Baltimore, Md.
Warner, Julia, Duke Hospital, Durham, N. C.
Warner, Lilyan, 43rd Gen. Hospital, APO 420, % PM, New York, N. Y.
Warren, Catharine, 688 Boston Post Rd., Weston, Mass.
Warren, Dorothy, 688 Boston Post Rd., Weston, Mass.
Warren, Elizabeth, R. # 2, Framingham, Mass.
Warren, Mabel, 180 E. Delaware Pl., Chicago, Ill.
Warren, Winifred, Vet. Admin. Facility, Indianapolis, Ind.

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Watrous, May (See Niles).
Watters, Kathryn (See Austin).
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Way, Corinne, U. S. N. Hospital, Dublin, Ga.
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Weber, Mr. Earl, 5515 W. Greenfield Ave., Milwaukee, Wis.
Weber, Lucile, Station Hospital, Camp Polk, La.
Weckel, Harriet, 103 Romie Lane, Salinas, Calif.
Weidlich, Frances, 425 W. 2nd St., Dayton, O.
Weigele, Clara, 318 W. Franklin St., Richmond, Va.
Weinberg, Sylvia, 221 Lafayette St., Salem, Mass.
Weinstein, Mildred (See Selenhow).
Weintraut, Sister M. Philonilla (Jr.), St. Francis Hospital, Colorado Springs, Colo.
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Welch, Esther, P. O. Box 670, El Paso, Tex.
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Welling, Maude, Farmington, Utah.
Wellock, Lois, Nelson School, Muskegon, Mich.
Wells, M. Caroline, Mitchell Conv. Hospital, Camp Lockett, Calif.
Wells, Isabelle, McGuire Gen. Hospital, Richmond, Va.
Wells, Myrtle, 1119 First St., S. W., Rochester, Minn.
Welsh, Mary (See Brazonis).
Wenhart, Elizabeth, 315th Gen. Hospital, APO 18833, % PM, San Francisco, Calif.
Wentworth, Mary (See Knight).
Wenz, Theodora, 522 Hansel Rd., Wynnewood, Pa.
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Werthmann, Alfriede (See Prins).
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Wesson, Naomi, 1001 Dean Pl., Oklahoma City, Okla.
West, Mr. Elisha, 4401 Market St., Philadelphia, Pa.
West, Florence, 2309 N. 27th St., Tacoma, Wash.
Westervelt, Eleanor, 400 E. 56th St., New York, N. Y.
Wetterhuus, Anna, 2020 E. 93rd St., Cleveland, O.
Wheatley, Alice, Box 192, Brooke Gen. Hospital, Ft. Sam Houston, Texas.
Wheeldon, Gladys, 318 W. Franklin St., Richmond, Va.
Wheeler, Anita, National Navy Med. Center, Bethesda, Md.
Wherry, Louise (See Woodson).
Whintrop, Miriam, 216 Dennison St., Highland Park, N. J.
Whipple, Marguerite, Box 7155, Billings Gen. Hospital, Ft. Harrison, Ind.
Whitaker, Edith, 444 Churchill Ave., Palo Alto, Calif.
White, Antoinette, 371 S. Marengo Ave., Pasadena, Calif.
White, Barbara, 239 E. 58th St., New York, N. Y.
White, Irene, 4258 White Oak Ct., Pittsburgh, Pa.
White, Mildred, 400 W. Maple, Shelbina, Mo.
White, Sarah, Norfolk Gen. Hospital, Norfolk, Va.
Whiting, Avis (See Lostetter).
Whiting, Helen, 84 Ashland Ave., Buffalo, N. Y.
Whitlock, Helen, 300 S. 16th St., Lincoln, Neb.
Wible, Elizabeth, 416 Maple Ave., Edgewood, Pittsburgh, Pa.
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Wiechec, Mr. Frank, R. #4, Norristown, Pa.
Wiechec, Kathryn, R. #4, Norristown, Pa.
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Wiley, Margaret, 1401 S. Dodgion St., Independence, Mo.
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Williams, Patsy, 1315 Avenue "C," Galveston, Tex.
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Williamson, Marjorie, Regional Hospital, Kearns, Utah.
Willibalda, Sister (See Dasenbrock).
Wilsey, Emily, 710 Fourth St., Bismarck, N. D.
Wilson, Alma, Good Samaritan Hospital, Phoenix, Ariz.
Wilson, Elizabeth, 60th Gen. Hospital, Base F, APO 1009, % PM, San Francisco, Calif.
Wilson, Katharine, 2431 Demington Dr., Cleveland, O.
Wilson, Lois, P. O. Box 1612, Pittsburgh, Pa.
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Wingler, Estelle (Jr.), 140 N. State St., Chicago, Ill.
Winn, Elizabeth, Cummings Hospital School, Mt. Clemens, Mich.
Winn, Lillian, 7815 E. Jefferson Ave., Detroit, Mich.
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Winter, Ruth (See Scanlon).
Wintermote, Dorothy, Chambers, Nebraska.
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Wiseman, Eleanor, 400 Elm Ave., Bogota, N. J.
Wisneski, Mayola, 232nd Gen. Hospital, McCloskey Gen. Hospital, Temple, Texas.
Witter, Dorothy, 251st Gen. Hospital, APO 513, % PM, New York, N. Y.
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Y

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Young, Patience, 275 Beacon St., Boston, Mass.
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Yuhas, Mary (See Pelka).
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Z

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The names of technicians registered since Jan. 31, 1945 will appear in the reprinted directory which will be available for distribution about Sept. 1, 1945.